# 100MHz oscilloscope with dual delayed timebase, event counter and TV triggering

# PM3263X

## Instruction Manual/Gerätehandbuch/Notice d'emploi et d'entretien

9499 443 02902
820409/1

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# 100MHz oscilloscope with dual delayed timebase, event counter and TV triggering

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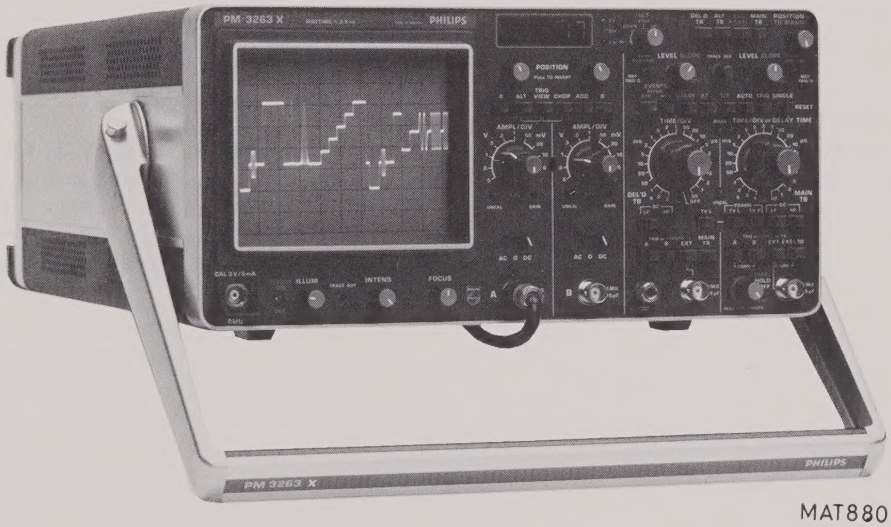


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This insert must be used with the manual of the PM3263, publication number 9499 443 02002.

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## IMPORTANT

In correspondence concerning this instrument, please quote the type number and serial number as given on the type plate.

*NOTE:* *The design of this instrument is subject to continuous development and improvement. Consequently, this instrument may incorporate minor changes in detail from the information contained in this manual.*

## WICHTIG

Bei Schriftwechsel über dieses Gerät wird gebeten, die genaue Typenbezeichnung und die Gerätenummer anzugeben. Diese befinden sich auf dem Leistungsschild.

*BEMERKUNG:* *Die Konstruktion und Schaltung dieses Geräts wird ständig weiterentwickelt und verbessert. Deswegen kann dieses Gerät von den in dieser Anleitung stehenden Angaben abweichen.*

## IMPORTANT

RECHANGE DES PIECES DETACHEES (Réparation)
Dans votre correspondance et dans vos réclamations se rapportant à cet appareil, veuillez TOUJOURS indiquer le numéro de type et le numéro de série qui sont marqués sur la plaquette de caractéristiques.

*REMARQUES:* *Cet appareil est l'objet de développements et améliorations continuels. En conséquence, certains détails mineurs peuvent différer des informations données dans la présente notice d'emploi et d'entretien.*

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# Operating manual

# 1. GENERAL INFORMATION

## 1.1. INTRODUCTION

PM3263X is a TV-version of the PM3263. It adds an automatic TV triggering to the facilities of the PM3263.

The trigger input can be selected for pos. or neg. going video signals.

The M.T.B. triggering provides the following trigger modes:

- TV FIELD
- TV LINE
- TV FRAME

The D.T.B. can be set in a free running mode or is triggered by the line pulses provided by the M.T.B. trigger source.
If the TV LINE triggering for the D.T.B. is used, the event counting modes have been arranged in such a way that the LED display number corresponds with the line number conforming to EBU and CCIR standards.

TTL-triggering is no longer available in the PM3263X.

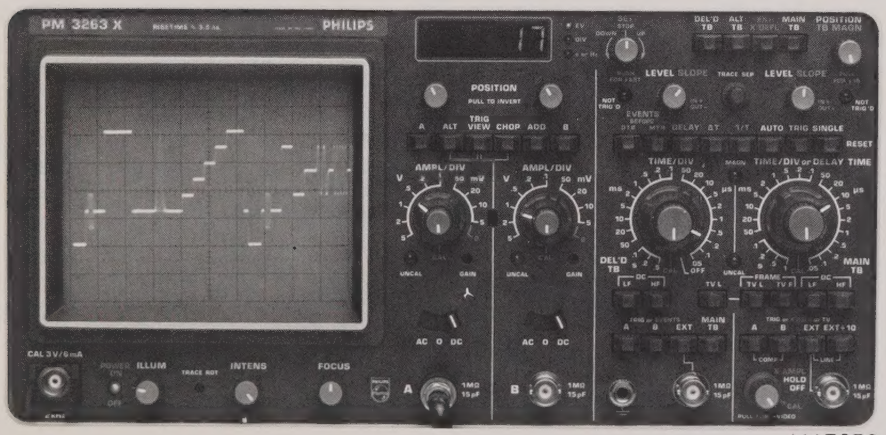


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*Fig. 1.1. Front view PM3263X.*

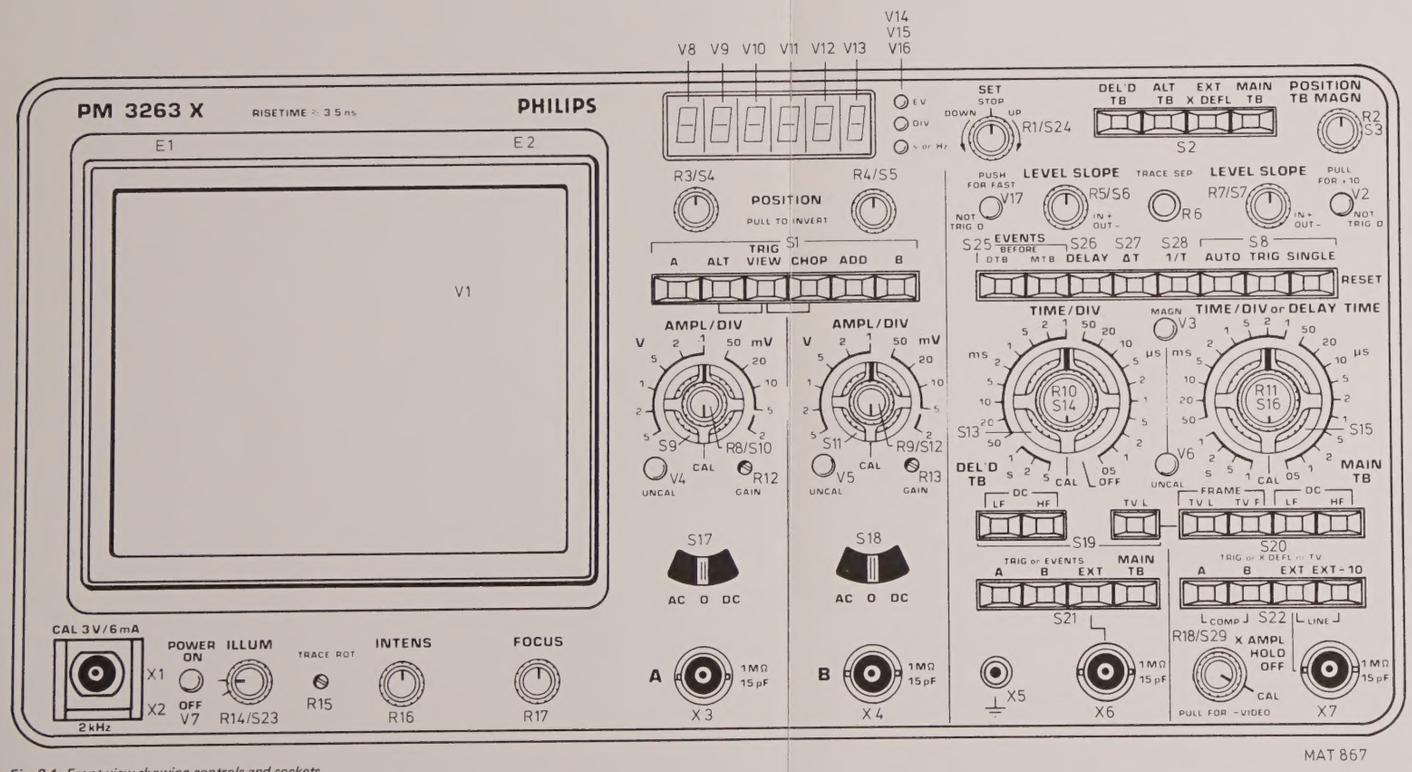


*Fig. 2.1. Front view showing controls and sockets*
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*Fig. 2.1. Vue avant montrant les commandes et douilles*



## 1.2. CHARACTERISTICS

This instrument has been designed and tested in accordance with IEC Publication 348 for Class 1 instruments and has been supplied in a safe condition. The present Instruction Manual contains information and warnings that shall be followed by the purchaser to ensure safe operation and to maintain the instrument in a safe condition.

- This specification is valid after the instrument has warmed up for 30 minutes (reference temperature 23°C).
- Properties expressed in numerical values with tolerance stated, are guaranteed by the manufacturer. Numerical values without tolerances are typical and represent the characteristics of an average instrument.
- Inaccuracies (absolute or in %) relate to the indicated reference value.

Only the additional or different data with respect to the basic instrument PM3263 are given.

| Designation | | Specification |
|---|---|---|
| **TV Triggering** | | |
| Input polarity | : | switchable for positive and negative video |
| Input source | : | via MTB trigger channel |
| Trigger mode | : | TV LINE triggering at any line<br>TV FIELD triggering at any field<br>TV FRAME triggering at field 1, slope switch at +,<br>triggering at field 2, slope switch at −. |
| Trigger slope | : | see timing diagram fig. 1.2. |
| Trigger sensitivity | : | INT: 0,5 div (sync. part of video signal)<br>EXT: 50mV (sync. part of video signal)<br>EXT ÷ 10: 500mV (sync. part of video signal) |
| Trigger level | : | Automatically set for TV triggering |
| Delayed time base | : | The DTB will start immediately after the delay time (DTB trigger source at MAIN TB) or will be triggered by the line sync. pulse derived from MTB-trigger source by TVL-selection (DTB-compartment) |
| Line selection | : | In EVENTS before DTB and EVENTS before MTB modes the LED display shows the line number conforming to EBU and CCIR standards. (TV-frame mode) |

TTL-triggering is no longer available in the PM3263X.

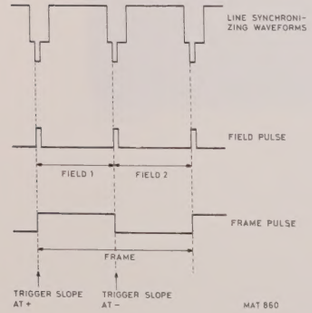


*Fig. 1.2. Timing diagram trigger-slope*

# 2. OPERATING INSTRUCTIONS

## 2.1. GENERAL INFORMATION

This section outlines the procedures and precautions necessary for operation. It identifies and briefly describes the functions of the front and rear panel controls and indicators, and explains the practical aspects of operation to enable an operator to evaluate quickly the instrument's main functions.

## 2.2. SWITCHING ON

Before switching on, ensure that the oscilloscope has been correctly installed in accordance with chapter 2 of the PM3263 manual.

| | |
|---|---|
| **WARNING:** | **The oscilloscope must never be switched on whilst any circuit board is removed. Never remove a circuit board until the oscilloscope has been switched-off for at least one minute.** |

## 2.3. EXPLANATION OF CONTROLS AND SOCKETS

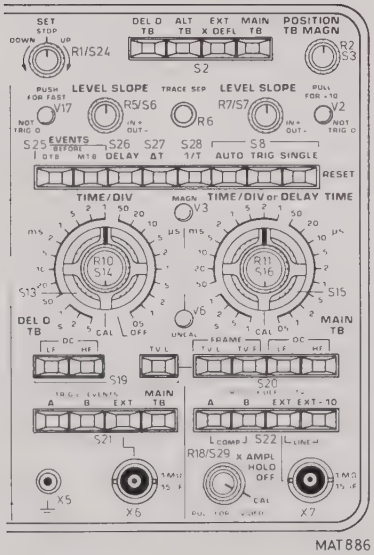


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*Fig. 2.2. Detail of front panel showing the T.V. controls.*

### 2.3.1. Main Time-base

| | |
|---|---|
| TVL depressed | Trigger coupling adapted to TV line sync. pulses. |
| TVF depressed | Trigger coupling adapted to odd and even TV field sync. pulses. (Q:FI and FII). |
| TVL and TVF depressed | Trigger coupling adapted to odd or even TV field sync. pulses. (Q:FI or FII). Selection of the odd or even field can be made by the MTB slope switch. |
| LF depressed | According to LF trig. coupling of PM3263. |
| HF depressed | According to HF trig. coupling of PM3263. |
| LF and HF depressed | According to DC trig. coupling of PM3263. |
| LEVEL-SLOPE | According to the LEVEL-SLOPE functions of the PM3263 in DC/LF/HF mode. |
| LEVEL (R7) | The LEVEL control is not effective in TV trigger coupling mode. |
| SLOPE (S7) | The SLOPE control must be pulled for even field pulses (Q:FII) or depressed for odd field pulses (Q:FI). This control is only effective in TV-FRAME mode. |
| PULL FOR–VIDEO (S29) | Selection of the positive or negative TV-signal. The control must be pulled for negative video. |

### 2.3.2. Delayed Time-base

| | |
|---|---|
| LF depressed | According to LF trig. coupling of PM3263. |
| HF depressed | According to HF trig. coupling of PM3263. |
| LF and HF depressed | According to DC trig. coupling of PM3263. |
| TVL depressed | Trigger coupling adapted to the TV line sync. pulses. |

## 2.4. INFORMATION OF THE PRINCIPLE OF TV WORKING

### 2.4.1. Selection of the MTB trigger mode

The DC, LF and HF trigger coupling are similar to the PM3263.
The addition is the automatic TV triggering.
In position TVL, triggering of line synchronisation pulses are obtained provided that the pull for–video push-pull switch (S29) has the correct position.
In position TVF and FRAME, triggering of the field synchronisation pulses is obtained.
However, the difference between the two positions is that the FRAME position selects the odd or even field pulses (Q:FI or FII) so that the complete TV field is triggered and the FIELD position selects the odd and even field pulses. (Q:FI and FII).

### 2.4.2. Selection of the DTB trigger mode

The DC, LF and HF trigger coupling are similar to the PM3263.
The only TV position for the DTB trigger coupling is the TVL, which provides triggering of the line sync. pulses.
The event counting modes have now been arranged in such a way that the LED display number corresponds with the line number of the video signal.
The LEVEL control is not effective in TVL trigger coupling mode.

# Bedienungsanleitung

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# 1. ALLGEMEINE ANGABEN

## 1.1. EINLEITUNG

Das PM3263X ist die TV-Ausführung des PM3263. Mit diesem Gerät können, zusätzlich zu den Möglichkeiten des PM3263, positive und negative Videosignale automatisch getriggert werden.

Die Hauptzeitbasis (MTB) kann auf folgende Triggersignale eingestellt werden:

- TV FIELD (Halbbild)
- TV LINE (Zeile)
- TV FRAME (Vollbild)

Die verzögerte Zeitbasis (DTB) kann freilaufend eingestellt werden, oder sie wird von den Zeilenimpulsen getriggert, die von der Triggerquelle der MTB abgenommen werden.
Wird die DTB von den Fernsehzeilen getriggert, ist der EVENT-Zähler so geschaltet, dass die LED-Anzeige die Zeilenummer der EBU-und der CCIR-Norm entsprechend anzeigt.

Eine TTL-Triggerung ist beim PM3263X nicht möglich.

*Abb. 1.1. Vorderansicht des PM3263X.*

## 1.2. TECHNISCHE DATEN

Dieses Gerät ist gemäss IEC 348, Sicherheitsbestimmungen für elektrische Mess- und Regeleinrichtungen, gebaut und geprüft und hat das Werk in sicherheitstechnisch einwandfreiem Zustand verlassen. Um diesen Zustand zu erhalten und einen gefahrlosen Betrieb sicherzustellen, muss der Anwender die Hinweise und Warnvermerke beachten, die in dem vorliegenden Gerätehandbuch enthalten sind.

- Fehlerangaben gelten nach einer Anwärmzeit von 30 Minuten nach dem Einschalten bei konstanter Betriebslage (Referenztemperatur 23°C).
- Nur Angaben mit Toleranzen oder Grenzwerten können als garantierte Daten angesehen werden. Daten ohne Toleranzen, das heisst ohne Fehlergrenzen, sind informative Daten und werden nicht garantiert.
- Falls nicht anders angegeben, beziehen sich relative und absolute Toleranzen auf den eingestellten Wert.

Es sind nur diejenigen Daten aufgeführt, die von denen des Grundinstruments PM3263 abweichen oder zusätzlich aufgenommen wurden.

| Benennung | Spezifikation |
|---|---|
| **TV-Triggerung** | |
| Eingangspolarität | : umschaltbar auf positives und negative Videosignal |
| Eingangsquelle | : über MTB-Triggerkanal |
| Triggerart | : TV LINE, Triggerung bei jeder Zeile<br>TV FIELD, Triggerung bei jedem Halbbild<br>TV FRAME, Triggerung von Halbbild 1, Schalter "slope" auf +<br>Triggerung von Halbbild 2, Schalter "slope" auf – |
| Triggerflanke | : siehe Zeitsteuer-Diagramm Abb. 1.2. |
| Triggerempfindlichkeit | : INT: 0,5 Teil (Sync.-Teil des Videosignals)<br>EXT: 50 mV (Sync.-Teil des Videosignals)<br>EXT ÷ 10: 500 mV (Sync.-Teil des Videosignals) |
| Triggerpegel | : Bei TV-Triggerung automatisch eingestellt. |
| Verzögerte Zeitbasis | : Die verzögerte Zeitbasis started sofort nach Ablauf der Verzögerungszeit (DTB-Triggerquelle an MTB) oder wird von dem Zeilenimpuls getriggert, der nach Drücken der Taste TVL (im DTB-Feld) von der MTB-Triggerquelle abgenommen wird. |
| Zeilenwahl | : Sowohl bei EVENTS vor DTB als auch EVENTS vor MTB erscheint auf der LED-Anzeige die Zeilennummer der EBU- und der CCIR-Norm entsprechend. (Betriebsart: TV FRAME) |

Eine TTL-Triggerung ist beim PM3263X nicht möglich.

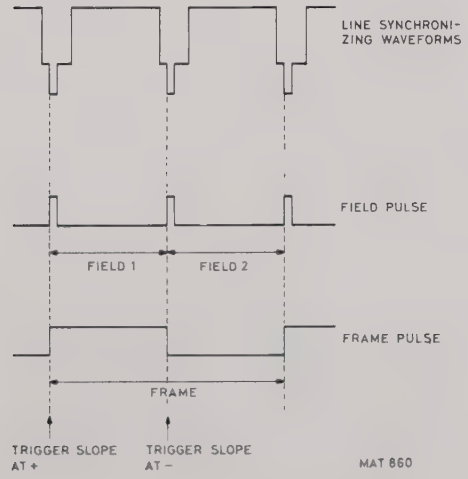


*Abb. 1.2. Zeitsteuer-Diagramm Triggerflanke.*

# 2. BEDIENUNGSANWEISUNGEN

## 2.1. ALLGEMEINES

Dieser Abschnitt gibt einen Überblick der für die Bedienung erforderlichen Handlungen und Vorsichtmassregeln. Er beschreibt und erläutert in Kursform die Funktion der Bedienungsorgane auf Frontplatte und Rückwand sowie der Anzeigen. Ausserdem sind hier die praktischen Gesichtspunkte der Bedienung erklärt; dies ermöglicht dem Bedienunenden eine rasche Bewertung der Hauptfunktionen des Geräts.

## 2.2. EINSCHALTEN DES GERATES

Vor dem Einschalten prüfen, ob das Oszilloskop, wie in Abschnitt 2 der Bedienungsanleitung des PM3263 angegeben, angeschlossen ist.

**WARNUNG:**

**Der Oszillograf darf niemals eingeschaltet werden, wenn eine Leiterplatte entfernt wurde.**
**Einer Leiterplatte darf nicht früher als eine Minute nach Ausschaltung des Gerätes entfernt werden.**

## 2.3. ERKLARUNG DER BEDIENUNGSORGANE UND ANSCHLUSSBUCHSEN

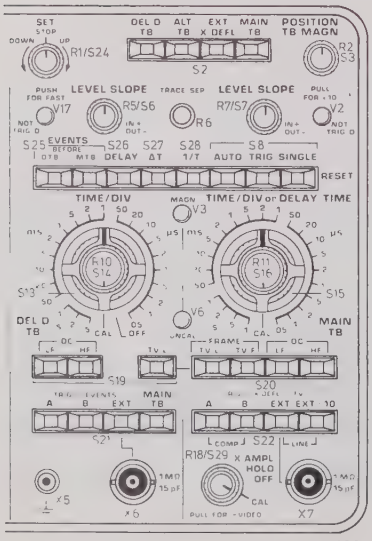

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*Abb. 2.2. Frontplattenausschnitt mit den TV-Bedienungsorganen.*

### 2.3.1. Hauptzeitbasis

| | |
|---|---|
| TVL gedrückt | Triggerkopplung angepasst an die Zeilensynchronimpulse. |
| TVF gedrückt | Triggerkopplung angepasst an die gradzahligen und ungradzahligen Halbbild-Synchronimpulse. (Q:FI und FII). |
| TVL und TVF gedrückt | Triggerkopplung angepasst an die gradzahligen oder ungradzahligen Halbbild-Synchronisationsimpulse. (Q:FI oder FII).<br>Wahl des gradzahligen oder ungradzahligen Bildes ist mit dem Schalter "MTB slope" möglich. |
| LF gedrückt | Entspricht der NF-Triggerkopplung des PM3263. |
| HF gedrückt | Entspricht der HF-Triggerkopplung des PM3263. |
| LF und HF gedrückt | Entspricht der DC-Triggerkopplung des PM3263. |
| LEVEL-SLOPE | Entspricht den LEVEL-SLOPE-Funktionen des PM3263 bei den Betriebsarten DC/LF/HF. |
| LEVEL (R7) | Dieser Einsteller ist bei der TV-Triggerung ausser Betrieb. |
| SLOPE (S7) | Dieser Schalter muss für die Impulse der gradzahligen Halbbilder (Q:FII) herausgezogen und für die Impulse der ungradzahligen Halbbilder (Q:FI) gedrückt sein.<br>Dieser Schalter funktioniert nur bei der Betriebsart TV-FRAME. |
| PULL FOR-VIDEO (S29) | Wahl von positiven oder negativen Fernsehsignalen.<br>Bei einem negativen Videosignal muss der Schalter herausgezogen sein. |

### 2.3.2. Verzögerte Zeitbasis.

| | |
|---|---|
| LF gedrückt | Entspricht der NF-Triggerkopplung des PM3263. |
| HF gedrückt | Entspricht der HF-Triggerkopplung des PM3263. |
| LF und HF gedrückt | Entspricht der DC-Triggerkopplung des PM3263. |
| TVL gedrückt | Triggerkopplung an die Zeilensynchronimpulse angepasst. |

## 2.4. TRIGGERUNG VON TV-SIGNALEN

### 2.4.1. Triggerung der Hauptzeitbasis

Die Gleichspannungs-, Niederfrequenz- und Hochfrequenz-Triggerkopplungen sind die gleichen wie beim PM3263. Zusätzlich besitzt dieses Gerät eine automatische TV-Triggerung.
In Stellung TVL dienen die Zeilensynchronimpulse als Triggerquelle, vorausgesetzt, dass der Druck-Zugschalter PULL FOR-VIDEO (S29) in der richtigen Stellung steht.
In den Stellungen TVF und FRAME erfolgt die Triggerung mit Hilfe der Halbbild-Synchronisationsimpulse. Der Unterschied zwischen diesen beiden Stellungen ist, dass in Stellung FRAME die gradzahligen oder ungradzahligen Halbbildimpulse zum Triggern herangezogen werden, so dass das vollständige TV-Halbbild getriggert wird.

### 2.4.2. Triggerung der verzögerten Zeitbasis

Die Gleichspannungs-, Niederfrequenz- und Hochfrequenz-Triggerkopplung ist wieder dieselbe wie beim PM3263. Bei der verzögerten Triggerung kann nur die Taste TVL gedrückt werden, d.h., die Zeilensynchronisationsimpulse werden zur Triggerung herangezogen.
Der EVENT-Zähler ist nun so geschaltet, dass auf der LED-Anzeige die Zeilennummer des Videosignals angezeigt wird.
Der LEVEL-Einsteller hat bei dieser Triggerkopplung keine Funktion.

# Notice d’emploi

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# 1. INFORMATION GENERALE

## 1.1. INTRODUCTION

Le PM3263-X est la version TV du PM3263. Il enrichit les possibilités offertes par le PM3263 d'un déclenchement TV automatique.

L'entrée de déclenchement peut être choisie pour des signaux vidéo positifs ou négatifs.

Le déclenchement de la base de temps principale propose un choix entre les modes de déclenchement ci-dessous;

- TV TRAME
- TV LIGNE
- TV IMAGE

La base de temps retardée peut être choisie en mode relaxé ou être déclenchée par les impulsions lignes à fournir par la source de déclenchement de la base de temps principale.

Avec le déclenchement TV LIGNE pour la base de temps retardée, les modes de comptage d'événements fonctionnent de manière telle que le numéro affiché par les LED correspond au numéro de ligne selon les standards EBU et CCIR.

Le déclenchement 'sur niveau TTL' est impossible sur le PM3263X.

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*Fig. 1.1. Vue avant du PM3263X.*

## 1.2. CARACTERISTIQUES TECHNIQUES

Cet instrument a été conçu conformément à la norme C.I.E. 348 pour les appareils de classe 1. A la livraison, il répond aux règles de sécurité. La présente notice comporte des informations et les avertissements nécessaires à l'utilisateur afin d'assurer le fonctionnement de l'instrument dans les conditions de sécurité requises et de le maintenir dans un état conforme à la norme.

- Toutes les spécifications sont valables après un temps d'échauffement de 30 min. (température de référence 23°C) et sans modifier la position de l'appareil.
- Seules les valeurs accompagnées d'une tolérance ou d'une limite sont garanties; les caractéristiques sans tolérance sont données à titre indicatif.
- Les précisions (absolue ou en %) se rapportent à la valeur de référence indiquée.

Seules les données différentes ou présentant un caractère supplémentaire, ceci par rapport à la version de base PM3263, sont mentionnées ici.

| Dénomination | Spécification |
|---|---|
| **Déclenchement TV** | |
| Polarité d'entrée | : commutable pour vidéo de signe positif et négatif |
| Source d'entrée | : par l'intermédiaire de la voie de déclenchement de la base de temps principale |
| Mode de déclenchement | déclenchement TV LIGNE avec sélection arbitraire de la ligne<br>déclenchement TV TRAME avec sélection arbitraire de la trame<br>déclenchement TV IMAGE, à la trame 1, le sélecteur de pente se trouvant en position +,<br>déclenchement TV IMAGE, à la trame 2, le sélecteur de pente se trouvant en position - |
| Pente de déclenchement | : voir le diagramme de temps de la figure 1.2 |
| Sensibilité de déclenchement | : INT 0,5 division (partie 'synchronisation' du signal vidéo)<br>EXT 50 mV (partie 'synchronisation' du signal vidéo)<br>EXT 10:500 mV (partie 'synchronisation' du signal vidéo) |
| Niveau de déclenchement | réglage automatique pour déclenchement TV |
| Base de temps retardée | le déclenchement de la base de temps retardée intervient immédiatement après la période de retard (source de déclenchement de la base de temps retardée à la base de temps principale) ou bien à déclenchement par l'impulsion de synchronisation lignes prélevée sur la source de déclenchement de la base de temps principale par sélection TVL (compartiment de base de temps retardée) |
| Sélection lignes | : dans les modes EVENEMENTS précédant la base de temps retardée et EVENEMENTS précédant la base de temps principale, l'affichage LED indique le numéro de ligne selon les standards EBU et CCIR (mode TV frame) |

Le déclenchement 'sur niveau TTL' est impossible sur le PM3263X.

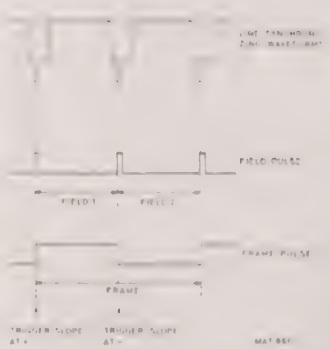


*Fig. 1.2. Diagramme de temps de la pente de déclenchement.*

# 2. INSTRUCTIONS D'UTILISATION

## 2.1. GENERALITES

La présente section décrit les travaux et précautions requises à l'utilisation. En outre, elle décrit sommairement les fonctions des commandes et des indicateurs et met en évidence les aspects pratiques du fonctionnement. De la sorte, un opérateur peut rapidement se familiariser avec les fonctions principales de l'instrument.

## 2.2. MISE EN CIRCUIT

Avant de procéder à la mise en circuit, vérifier l'installation correcte de l'oscilloscope conformément aux indications du chapitre 2 du manuel PM3263.

| | |
|---|---|
| ATTENTION: | **L'instrument ne doit jamais être enclenché lorsqu'une platine ou un bloc a été enlevé. Ne déposer de platine ou de bloc qu'une minute au moins après la mise hors service de l'instrument.** |

## 2.3. EXPLICATION SUR LES COMMANDES ET PRISES.

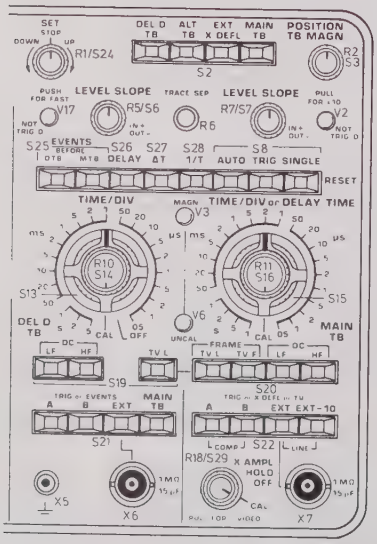


*Figure 2.2. Détail du panneau avant donnant une vue des commandes TV.*

### 2.3.1. Base de temps principale.

| | |
|---|---|
| TVL enfoncé | Accouplement de déclenchement adapté aux impulsions de synchronisation lignes TV. |
| TVF enfoncé | Accouplement de déclenchement adapté aux impulsions de synchronisation tram TV impaire et paire. (Q:FI et FII). |
| TVL et TVF enfoncés | Accouplement de déclenchement adapté aux impulsions de synchronisation trame TV impaire ou paire. (Q:FI ou FII).<br>La sélection de la trame impaire ou paire peut être effectuée avec le sélecteur de pente de la base de temps principale. |
| LF enfoncé | Correspond à l'accouplement de déclenchement LF du PM3263. |
| HF enfoncé | Correspond à l'accouplement de déclenchement HF du PM3263. |
| LF et HF enfoncés | Correspond à l'accouplement de déclenchement CC du PM3263. |
| NIVEAU-PENTE | Correspond aux fonctions NIVEAU-PENTE du PM3263 en modes CC/LF/HF. |
| NIVEAU (R7) | La commande NIVEAU ne fonctionne pas dans le mode d'accouplement de déclenchement TV. |
| PENTE (S7) | La commande PENTE doit être sortie pour les impulsions de trame paire (Q:FII) ou être enfoncée pour les impulsions de trame impaire. (Q:FI).<br>Cette commande functionne uniquement en mode TV FRAME. |
| PULL FOR - VIDEO (S29) | Sélection du signal TV positif ou négatif.<br>Pour le signal vidéo négatif, cette commande doit être placée en position 'sortie'. |

### 2.3.2. Base de temps retardée.

| | |
|---|---|
| LF enfoncé | Correspond à l'accouplement de déclenchement LF du PM3263. |
| HF enfoncé | Correspond à l'accouplement de déclenchement HF du PM3263. |
| LF et HF enfoncés | Correspond à l'accouplement de déclenchement CC du PM3263. |
| TVL enfoncé | Accouplement de déclenchement adapté aux instructions de synchronisation ligne TV. |

## 2.4. INFORMATION SUR LE PRINCIPE DE FONCTIONNEMENT EN MODE TV

### 2.4.1. Sélection du mode de déclenchement à base de temps principale.

L'accouplement de déclenchement CC, LF et HF est le même que sur le PM3263.
La fonction ajoutée est le déclenchement TV automatique.
En position TVL, le déclenchement des impulsions de synchronisation ligne est assuré à condition que le sélecteur (S29) 'pull for — video' occupe sa position correcte.
En position TVF et TRAME, le déclenchement des impulsions de synchronisation 'TRAME' est assuré.
Cependant. la différance entre les deux positions réside dans le fait que la position TRAME permet la sélection des impulsions de trame impaire ou paire de sorte que le déclenchement porte sur l'image TV complète.

### 2.4.2. Sélection du mode de déclenchement à base de temps retardée.

L'accouplement de déclenchement CC, LF et HF est le même que sur le PM3263.
La seule position TV pour l'accouplement de déclenchement à base de temps retardée est le TVL assurant le déclenchement des impulsions de synchronisation lignes.
Les modes de comtage d'événements sont maintenant exécutés de manière telle que le numéro affiché par les LED correspond au numéro de ligne du signal vidéo.
La commande NIVEAU ne fonctionne pas dans le mode d'accouplement de déclenchement TVL.

# Service manual

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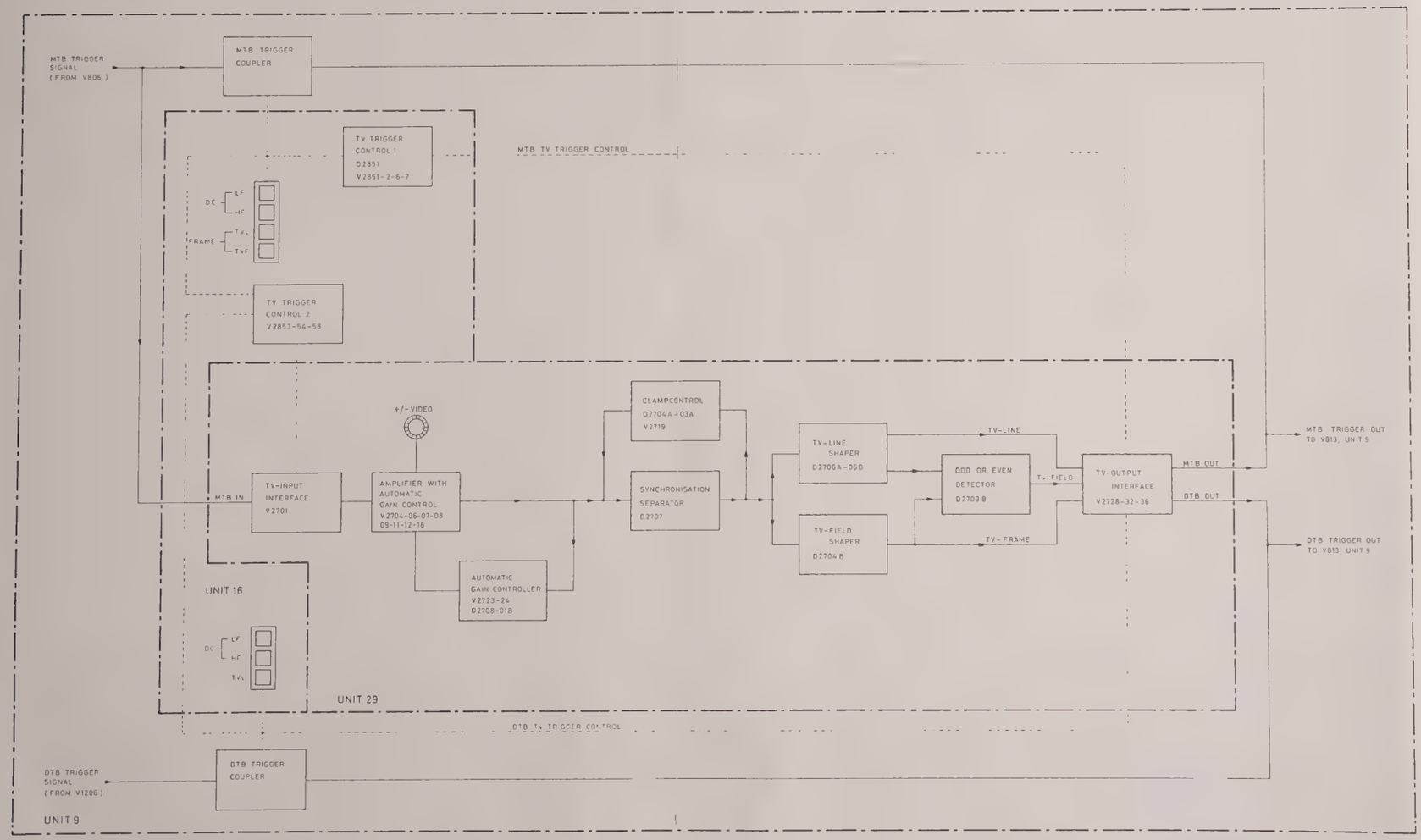


*Fig. 3.1. Blockdiagram of the TV-trigger circuit*



# 3. SERVICE MANUAL

## 3.1. CIRCUIT DESCRIPTION

### 3.1.1. Block diagram.

The blockdiagram of the TV trigger circuit of the PM3263X is shown in fig. 3.1.
The TV circuit receives its trigger signal from the mtb trigger amplifier (V806).
The amplifier with automatic gaincontrol processes this signal to a synchronisation pulse with a constant amplitude of 200mV pp, controlled by a feedback stage.
In the synchronisation separator and clampcontrol the signal is clamped and changed to the composite sync. pulse.
Via the TV-line shaper and the TV field shaper the comp. sync. pulse generates the triggerpulse for the TV-line or field.
The odd or even detector forms a level signal for triggering. The selection can be made to trigger on the odd field pulses or on the even field pulses. For Q-versions selection can be made to trigger on FI or FII.
In the TV-output interface, which is controlled by the mtb or dtb trigger coupler the TV selection is obtained and the output signal is supplied to V813 (MTB out) and V1216 (DTB out) on the trigger output.

### 3.1.2. Detailed circuit description

*3.1.2.1. Trigger coupler with TV-control*

If one of the TV push-buttons is selected two functions must be controlled:

–A TV trigger control I
The normal trigger-source functions have to be OFF.
This happens with the NAND-gates D2851.
In TV-mode at least one of the inputs of D2851 is logic 0 (–11,4V), so that the normal triggering is switched off via V2856.
Via the other NAND-gates of D2851 one of the TV-modes can be selected.
This selection controls the TV-output interface of the demodulator unit.

–B TV trigger control II

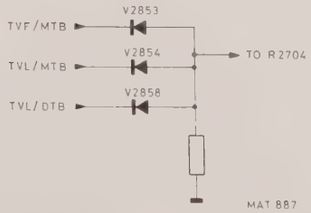


*Fig. 3.2. OR-gate for TV-selection.*

The diodes V2853, V2854 and V2858 forms an OR-gate.
If one or more of the TV push-buttons is selected, the output is set to –11,4V.
This level controls the input interface of the demodulator unit.

*3.1.2.2. TV-input interface.*

The MTB-in signal is connected via the diode switch V2701 to the base of V2704A.
Only if the output of the OR-gate is −11,5V, the diode switch is open.

*3.1.2.3. Amplifier with automatic gain control (A.G.C.).*

The amplifier consists of three stages:

- The first stage (V2704A, V2704B, V2708) in which the AGC-regulation is obtained by using FET2708 as a feedback resistor in the emittor of V2704A.
- The second stage is a differential amplifier (V2707, V2712) with the emittor followers V2706, V2711 and the common current source V2709.
  Via the diode switches V2713 and 2714 the +/- video selection can be made.
- The third stage V2718 is switched as an emittor follower to provide a low output impedance for the backstair clamper D2707.

*3.1.2.4. Automatic gain controller*

To obtain an automatic control of the gain FET V2708 is used, changing of the gate-source voltage gives a different channel resistance.
This gate-source voltage is generated by two current sources V2723 and V2724 who alternately charge or discharge capacitor C2721.
The ratio between charge and discharge time is varied in such a way that the sync. pulse amplitude is stabilised to 200 mV p.p.
If the amplitude is larger than 200 mV the comparator D2708 switches and the retriggerable one-shot D2701B starts. The time that the Q-output of D2701B will be high is slightly less than one line period.
This gives the possibility to control in each single line if the amplitude of the sync. pulse has the correct value of −200 mV.

*3.1.2.5. Synchronisation separator and clamp control.*

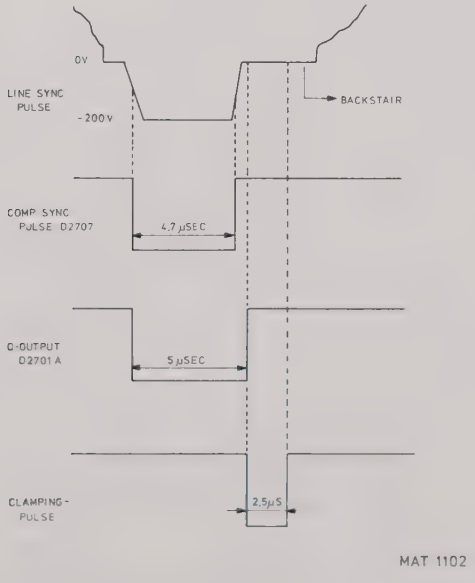


*Fig. 3.3. Timing diagram clamp control*

The normal condition is a clamping level of 0V with a sync. pulse of 200 mV pp.
This sync. pulse is delivered to one input of comparator D2707. The other input of D2707 has a preset of −100 mV via a voltage divider. So if the sync. pulse exceeds the −100 mV-level the comparator starts and a composite-sync. pulse is set to D2701A.
This one-shot generates a pulse at the $\overline{Q}$-output which is a little longer than the line sync. pulse.
The generated pulse passes a differential network and via D2702B a short pulse is available. This pulse is the clamping pulse with which the backstair of the video signal will be clamped (fig. 3.3. ). During the field pulses clamping is not allowed because in that time no backstair is present.
This is done by applying the composite sync. pulse and the short clampingpulse to NAND D2702B.
Only after each line sync. pulse and egalisation pulse a negative going pulse is present.
The pulses control MOS-FET switch V2719C, which is closed if the cathode of V2722 is Logic "O" and is open if the cathode of V2722 is Logic "1".
In the last situation (during the backstair) one plate of the clamping capacitor C2711 is set to 0V, the clamping level.
If no trigger pulses are applied to the Demodulator unit, after 400μsec. the Q-output of D 2704A becomes logic "0 ' and via V 2719A the normal condition of the clamping level is 0V approx.

*3.1.2.6. TV-shaper (see timing diagram).*

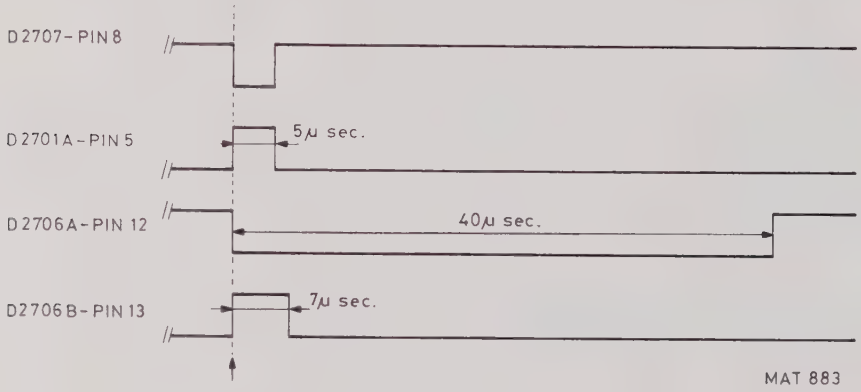


*Fig. 3.4.a. Timing diagram TVL-shaper*

Shaping of the trigger pulses is obtained via a number of one-shots. The composite sync. which is available at the Q-output of D2707 serves as trigger signal for the line- and field synchronisation.

— Line synchronisation (See fig. 3.4.a.).
The downgoing slope of the composite sync. starts the one shot D2701A, so at the $\overline{Q}$-output of D2701A pulses of 5 μ sec. time is available.
The upgoing slope starts the one-shot D2706A, which generates a pulse of ca. 40 μ sec.
This pulse is slightly longer than half the line period.
To detect the odd and even lines the obtained pulses are shorted to 7 μ sec. by D2706B; the line trigger pulse.

— Field synchronisation (See fig. 3.4.b.).
For the field synchronisation we use the inverted composite sync. pulse and the Q-output of D2701A.
Both signals are put to D2704B so that this retriggerable one-shot is triggered to the downgoing slope of the output pulse of D2701A, provided the B-input is high.
So only during a field pulse the output of D2704B delivers the field trigger pulse.

— Odd or even detector.
To form a level-signal for triggering on the odd or even field we use D2703B, if the $\overline{Q}$-output is high odd field triggering is obtained and if the $\overline{Q}$-output is low even field triggering is obtained.

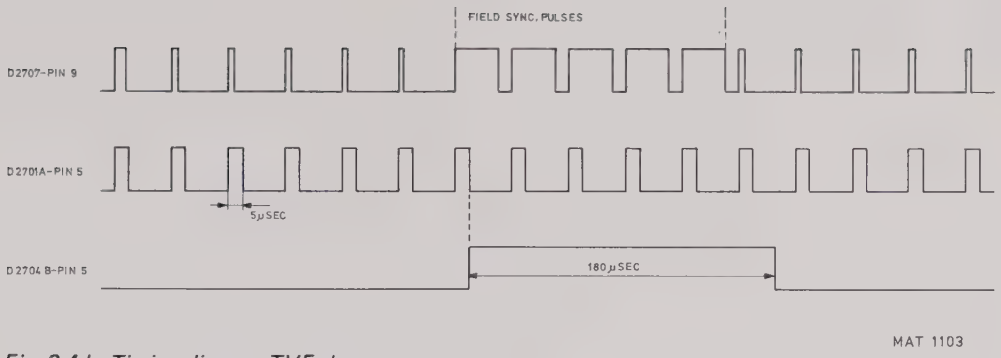


*Fig. 3.4.b. Timing diagram TVF-shaper*

### *3.1.2.7. TV-output interface.*

The output is controlled by the trigger-couples switches as described in 3.1.1.
The level of the output pulses is adapted to the level of the trigger unit via V2728, V2732 and V2736.

### *3.1.2.8. TV-count.*

If push-button TVF of the mtb trigger-coupling controls is depressed; the L-input of D2451 is set to 0V.
So if the address-lines A1 and A0 are both "1", the underneath information is fed to the microprocessor.

| A1 | A0 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|
| 1 | 1 | DTB "OFF" | 1/T | Push for FAST X 100 | UP/ DOWN | SLOPE | L |

In combination with EVENTS before DTB or EVENTS before MTB the event counter can count DTB line trigger pulses (assumed that TVL - DTB is also depressed!).
So it is possible to control an any given line of a FIELD or FRAME and the number of the line is displayed.

Selection of the appropriate FIELD depends on the setting of the SLOPE push-pull switch and will also be displayed.

| | SLOPE+ | SLOPE– |
|---|---|---|
| PM3263X<br>PM3263XQ | 2 ... 625<br>FI 4 ... 554 | 314 ... 625; 1 ... 312<br>FII 5 ...555 |

## 3.2. CHECKING AND ADJUSTING

> **WARNING**
>
> **The opening of covers or removal of parts, except those to which access can be gained by hand, is likely to expose live parts, and also accessible terminals may be live.**
> **The instrument shall be disconnected from all voltage sources before any adjustment, replacement or maintenance and repair during which the instrument will be opened.**
> **If afterwards any adjustment, maintenance or repair of the opened instrument under voltage is inevitable, it shall be carried out only by a skilled person who is aware of the hazard involved.**
> **Bear in mind that capacitors inside the instrument may still be charged even if the instrument has been separated from all voltage sources.**

### 3.2.1. General information.

The following information provides the complete checking and adjusting procedure for the video control of the PM3263X and is a addition of the checking and adjusting procedure of the PM3263.
All controls which are mentioned without item numbers are located on the frontplate of the oscilloscope.

### 3.2.2. Recommended test equipment.

| Required instrument | Specifications | Example of required instrument |
|---|---|---|
| Video test signal generator<br>Digital multimeter | Pos. and neg. video<br>Wide voltage range | Philips PM 5519<br>Philips PM 2527 |

### 3.2.3. Preliminary control settings.

All preset potentiometers and trimming capacitors are indicated on the drawings of the printed-wiring board, see the figures 3.5. and 3.6.

- Push the Y POSITION controls to the NORM position
- Depress push-buttons DC of the signal-coupling controls
- Set push-buttons EV bef. MTB, EV bef. DTB, DELAY, $\Delta$T and 1/T in released position.
- Depress push-button MAIN TB of the X deflection controls (S2)
- Push the TB MAGN control to position x1
- Set the MAIN TIME/DIV switch to 1 ms
- Set the DEL'D TIME/DIV switch to OFF
- Set all continuous controls to CAL
- Depress push-buttons DC of the trigger-coupling controls
- Depress push-buttons A of the trigger-source controls (S21, S22).

### 3.2.4. TV circuit

#### *3.2.4.1. TV level adjusting.*

- Set the potentiometers R860 and R1260 on the trigger amplifier in their mid-position.

*3.2.4.2. Positive video control*

- Depress push-button A of the display-mode controls (S1)
- Set the channel A AMPL/DIV switch to 1V and its vernier to CAL (S9)
- Set the mtb TIME/DIV switch to 0,2 m sec.
- Set the dtb TIME/DIV switch to OFF
- Push the mtb SLOPE switch to + (S7)
- Depress push-button B of the trigger-source controls (S22)
- Depress push-button TVF of the mtb trigger-coupling controls (S20)
- Depress push-button TRIG of the trigger-mode controls (S8)
- Push the pull for – video switch (S29)
- Check the base voltage of V2718
- Pull the pull for – video switch
- Check that the base voltage of V2718 does not change; if necessary, readjust potentiometer R2742 on the demodulator board
- Push the pull for – video switch
- Apply a positive video signal, sync. pulse 0,5 DIV p.p, to the channel A-input.
- Check that the signal triggers to the downgoing slope of the field sync. pulse (fig. 3.7.)
- Set the channel A AMPL/DIV switch to 50 mV.
- Adjust the channel A vernier control (R8) so that the field sync. pulse is 8 DIV p.p.
- Check that the signal still triggers to the downgoing slope of the field sync. pulse .

*3.2.4.3. Negative video control*

- Apply a negative video signal, sync. pulse 0,5 DIV p.p, to the channel A input.
- Pull the pull for – video switch
- Check that the signal triggers to the upgoing slope of the field sync. pulse
- Set the channel A AMPL/DIV switch to 1V and its vernier to CAL.
- Check that the signal still triggers to the upgoing slope of the field sync. pulse (fig. 3.8.)

*3.2.4.4. Frame/field control*

- Depress push-button TVL and TVF (= FRAME) of the mtb trigger-coupling controls
- Depress push-button TVL of the dtb trigger-coupling controls (S19)
- Depress push-button EVENTS before MTB (S25)
- Set the mtb TIME/DIV switch to 10$\mu$ sec.
- Push the pull for – video switch
- Apply a positive video signal, sync. pulse 0,5 DIV p.p. to the channel A-input.
- Set the display to 23 (Q-version: FI-25).
- Check that the signal triggers to the downgoing slope of the line sync. pulse and that the screen shows the odd field (fig. 3.9.)
- Pull the mtb SLOPE switch to –
- Check that the display shows 335 (Q-version: FII-26).
- Check that the signal triggers to the downgoing slope of the line sync. pulse and that the screen shows the even field (fig. 3.10.)
- Push the mtb SLOPE switch to +
- Depress push-button TVF of the mtb trigger-coupling controls
- Check that the screen shows the odd and even field (fig. 3.11.)
- Check that the mtb LEVEL control and the dtb LEVEL control is not effective
- Turn the SET control (R1) fully anti-clockwise.
- Check that the LED display stops at 2 (Q-version: FI-4).
- Turn the SET control (R1) fully clockwise.
- Check that the LED display stops at 625 (Q-version: FI-554).
- Depress push-button TVL of the mtb trigger-coupling controls
- Release push-button TVL of the dtb trigger-coupling controls
- Release push-button EVENTS before MTB
- Check that the screen shows any given video line (fig. 3.12.)

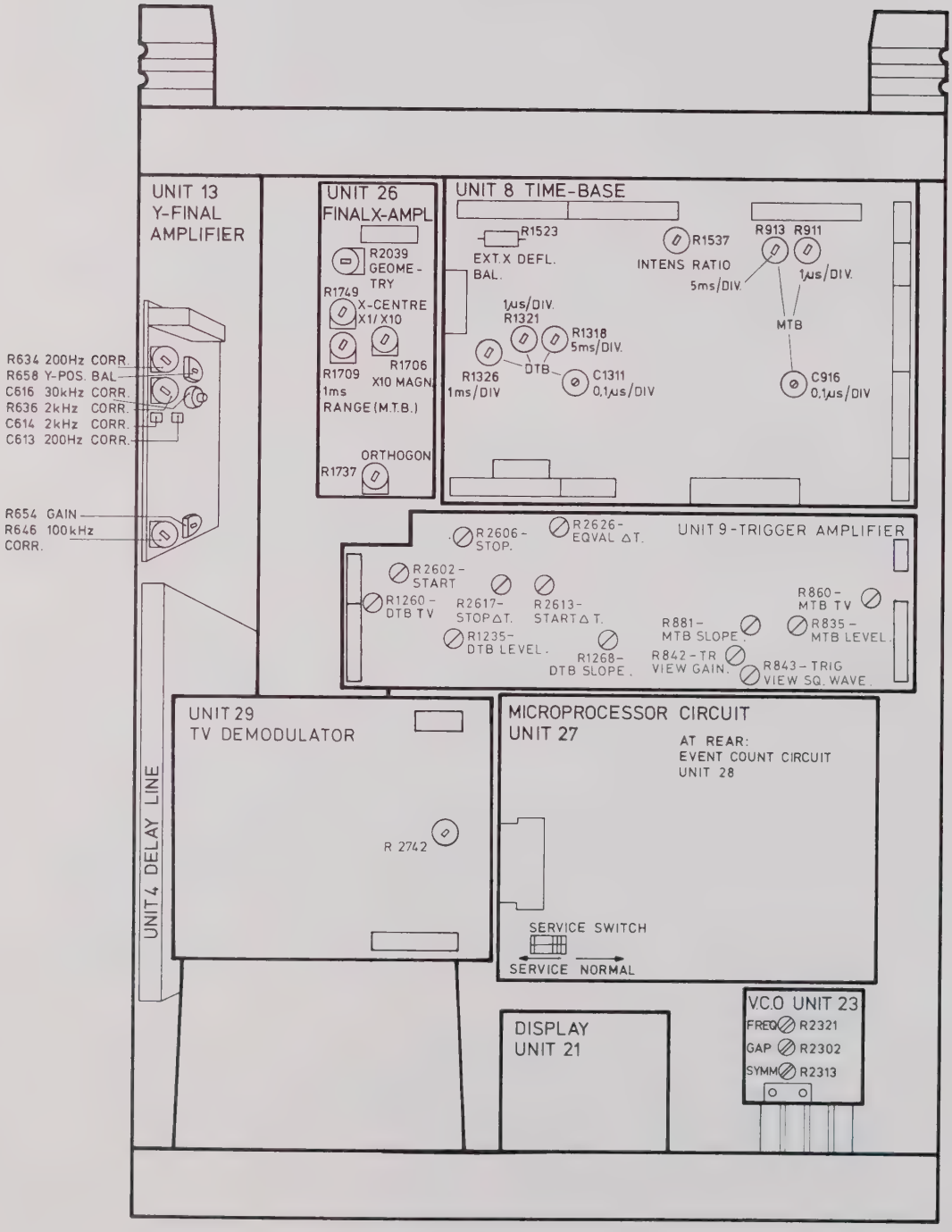


*Fig. 3.5. Top view with adjusting references.*

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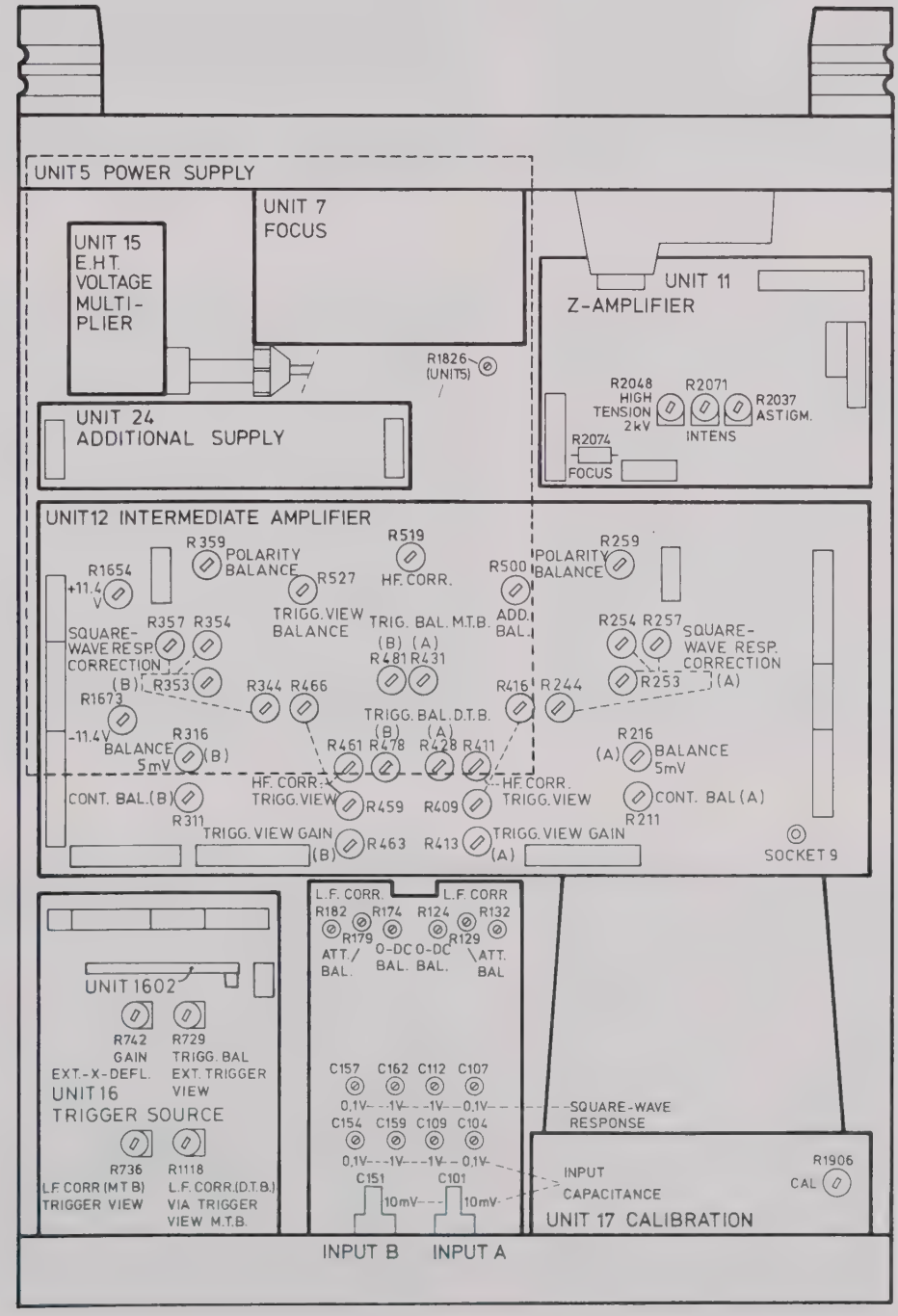


*Fig. 3.6. Bottom view with adjusting references.*

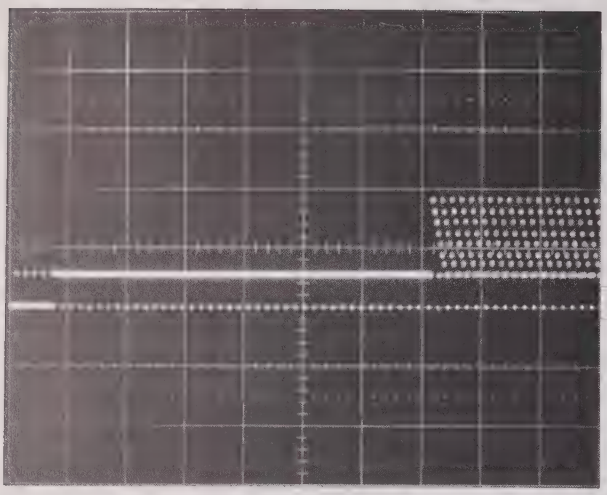

*Fig. 3.7. Positive video signal*

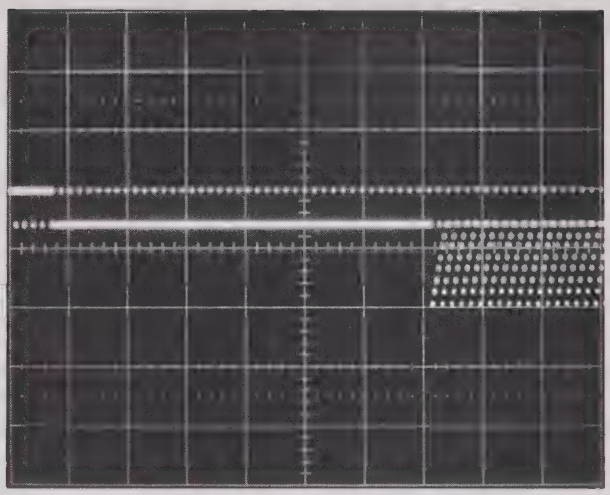

*Fig. 3.8. Negative video signal*

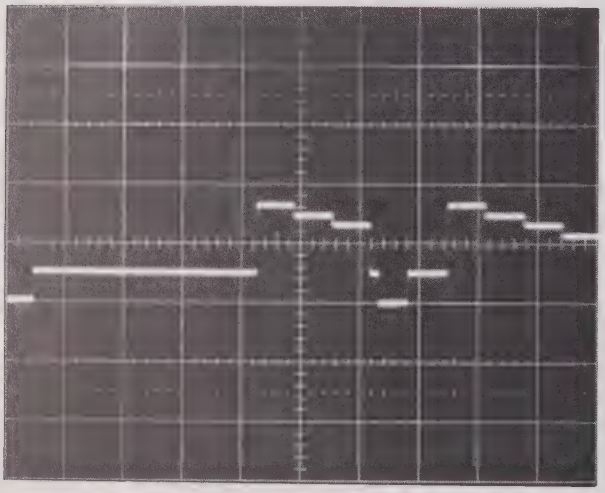

*Fig. 3.9. Display 23 (FI-25)*

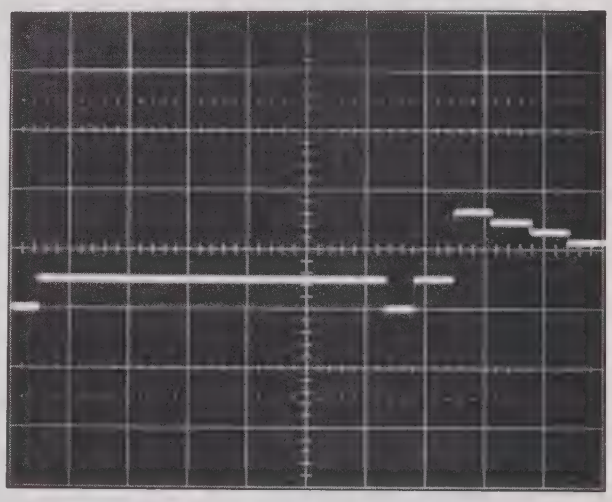

*Fig. 3.10. Display 335 (FII-26)*

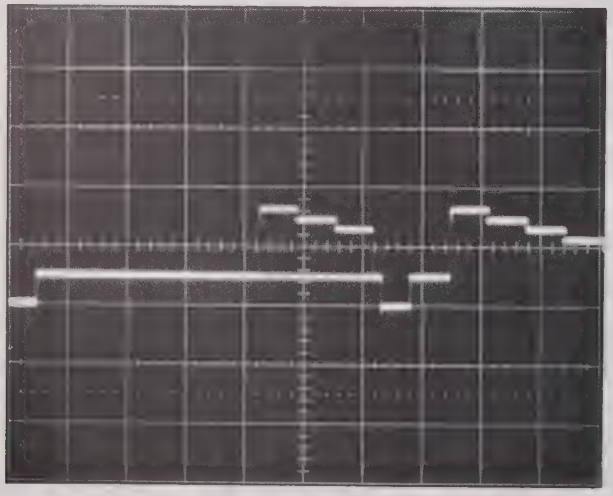

*Fig. 3.11 Display 23 (FI-25)*

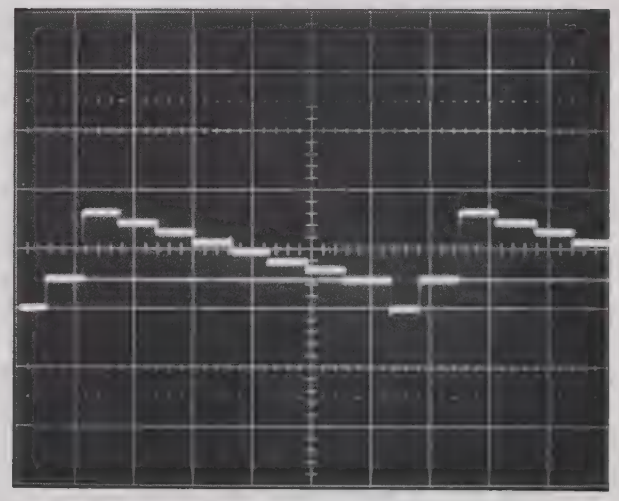

*Fig. 3.12. Any given TV-line*

## 3.3. PARTS LIST AND DIAGRAMS

| *Item* | *Ordering number* | *Description* |
|---|---|---|

**Capacitors**

| | | | | | | |
|---|---|---|---|---|---|---|
| C701 | CAPACITOR,CERAM | 8,2PF | 0,25PF | 500V | 4822 122 31194 |
| C702 | CAPACITOR,CERAM | 82PF | 2% | 100V | 4822 122 31237 |
| C703 | CAPACITOR,CERAM | 100PF | 10% | 500V | 4822 122 31211 |
| C704 | CAPACITOR,FOIL | 22NF | 10% | 250V | 4822 121 40407 |
| C705 | CAPACITOR,FOIL | 100NF | 10% | 250V | 4822 121 41161 |
| C706 | CAPACITOR,CERAM | 10NF | 80% | 100V | 4822 122 30043 |
| C707 | CAPACITOR,CERAM | 470PF | 10% | 500V | 4822 122 31177 |
| C708 | CAPACITOR,CERAM | 10NF | 80% | 100V | 4822 122 30043 |
| C710 | CAPACITOR,CERAM | 2,7PF | 0,25PF | 500V | 4822 122 31187 |
| C711 | CAPACITOR,CERAM | 10NF | 80% | 100V | 4822 122 30043 |
| C712 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C713 | CAPACITOR,TRIMM | 18PF | | | 5322 125 50051 |
| C714 | CAPACITOR,TRIMM | 18PF | | | 5322 125 50051 |
| C716 | CAPACITOR,FOIL | 100NF | 10% | 630V | 4822 121 40146 |
| C718 | CAP,ELECTROLYT. | 68UF | 50% | 10V | 4822 124 20689 |
| C719 | CAPACITOR,FOIL | 100NF | 10% | 250V | 4822 121 41161 |
| C1101 | CAPACITOR,CERAM | 100PF | 10% | 500V | 4822 122 31211 |
| C1102 | CAPACITOR,FOIL | 22NF | 10% | 250V | 4822 121 40407 |
| C1103 | CAPACITOR,CERAM | 10NF | 80% | 100V | 4822 122 30043 |
| C1104 | CAPACITOR,CERAM | 470PF | 10% | 500V | 4822 122 31177 |
| C1106 | CAPACITOR,CERAM | 3,9PF | 0,25PF | 500V | 4822 122 31217 |
| C1107 | CAPACITOR,TRIMM | 18PF | | | 5322 125 50051 |
| C2701 | CAPACITOR,CERAM | 5,6PF | 0,25PF | 100V | 4822 122 31047 |
| C2702 | CAP,ELECTROLYT. | 3,3UF | 40% | 16V | 4822 124 20947 |
| C2703 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2704 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2707 | CAP,ELECTROLYT. | 3,3UF | 40% | 16V | 4822 124 20947 |
| C2708 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2709 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2711 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2712 | CAPACITOR,CERAM | 2,2NF | 10% | 500V | 4822 122 31116 |
| C2713 | CAPACITOR,CERAM | 4,7NF | 10% | 100V | 4822 122 30128 |
| C2714 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2715 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2716 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2717 | CAPACITOR,CERAM | 2,7NF | 10% | 100V | 4822 122 30057 |
| C2718 | CAPACITOR,CERAM | 4,7NF | 10% | 100V | 4822 122 30128 |
| C2719 | CAPACITOR,CERAM | 4,7NF | 10% | 100V | 4822 122 30128 |
| C2722 | CAPACITOR,CERAM | 22NF | 80% | 63V | 4822 122 30103 |
| C2723 | CAPACITOR,CERAM | 150PF | 2% | 100V | 4822 122 31085 |
| C2724 | CAP,ELECTROLYT. | 150UF | 50% | 16V | 4822 124 20586 |
| C2726 | CAP,ELECTROLYT. | 150UF | 50% | 16V | 4822 124 20586 |

**Integrated circuits**

| | | | |
|---|---|---|---|
| D701 | INTEGR.CIRCUIT | LM208T | 5322 209 85475 |
| D1101 | INTEGR.CIRCUIT | LM208T | 5322 209 85475 |
| D2652 | INTEGR.CIRCUIT | PROM, EU-TYPE | 5322 209 10243 |
| | INTEGR.CIRCUIT | PROM USA TYPE | 5322 209 10244 |
| D2701 | INTEGR.CIRCUIT | SN74LS123N | 5322 209 85266 |
| D2702 | INTEGR.CIRCUIT | N74LS00N | 5322 209 84823 |
| D2703 | INTEGR.CIRCUIT | SN74LS74AN | 4822 209 80782 |
| D2704 | INTEGR.CIRCUIT | SN74LS123N | 5322 209 85266 |
| D2705 | INTEGR.CIRCUIT | MC3386P | 5322 209 86236 |
| D2706 | INTEGR.CIRCUIT | SN74LS123N | 5322 209 85266 |
| D2707 | INTEGR.CIRCUIT | NE527N | 5322 209 86546 |
| D2708 | INTEGR.CIRCUIT | LM311N | 5322 209 85503 |
| D2709 | INTEGR.CIRCUIT | SD5000N | 5322 209 85748 |
| D2851 | INTEGR.CIRCUIT | HEF4011BP | 5322 209 14046 |

| Item | Ordering number | Description | | | |
|---|---|---|---|---|---|
| **Resistors** | | | | | |
| R18 | POTM,CARBON | | | | 5322 102 44021 |
| R702 | RESISTOR,M.FILM 909K | 1% | 0,5W | | 5322 116 54408 |
| R703 | RESISTOR,M.FILM 110K | 1% | 0,4W | | 5322 116 54701 |
| R704 | RESISTOR,M.FILM 562E | 1% | 0,4W | | 5322 116 54009 |
| R706 | RESISTOR,M.FILM 750K | 1% | 0,5W | | 5322 116 54335 |
| R707 | RESISTOR,M.FILM 1K | 0,5% | 0,4W | | 4822 116 51235 |
| R708 | RESISTOR,M.FILM 1K | 0,5% | 0,4W | | 4822 116 51235 |
| R709 | RESISTOR,M.FILM 55E6 | 0,25% | 0,1W | | 5322 116 54386 |
| R712 | RESISTOR,M.FILM 33E2 | 1% | 0,4W | | 5322 116 50527 |
| R713 | RESISTOR,M.FILM 6K81 | 0,5% | 0,4W | | 4822 116 51252 |
| R714 | RESISTOR,M.FILM 24K9 | 1% | 0,4W | | 5322 116 54648 |
| R715 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R716 | RESISTOR,M.FILM 12K1 | 1% | 0,4W | | 5322 116 50572 |
| R718 | RESISTOR,M.FILM 24K9 | 1% | 0,4W | | 5322 116 54648 |
| R719 | RESISTOR,M.FILM 6K81 | 0,5% | 0,4W | | 4822 116 51252 |
| R721 | RESISTOR,M.FILM 12K1 | 1% | 0,4W | | 5322 116 50572 |
| R722 | RESISTOR,M.FILM 24K9 | 1% | 0,4W | | 5322 116 54648 |
| R723 | RESISTOR,M.FILM 6K81 | 0,5% | 0,4W | | 4822 116 51252 |
| R724 | RESISTOR,M.FILM 825E | 1% | 0,4W | | 5322 116 54541 |
| R726 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R727 | RESISTOR,M.FILM 1K1 | 0,5% | 0,4W | | 4822 116 51236 |
| R728 | RESISTOR,M.FILM 5K11 | 1% | 0,4W | | 5322 116 54595 |
| R729 | POTM,TRIMMING 10K | CERM LIN | 0,5W | | 5322 100 10113 |
| R731 | RESISTOR,M.FILM 187K | 1% | 0,4W | | 5322 116 54723 |
| R732 | RESISTOR,M.FILM 6K98 | 1% | 0,4W | | 5322 116 54605 |
| R733 | RESISTOR,M.FILM 2K49 | 1% | 0,4W | | 5322 116 50581 |
| R734 | RESISTOR,M.FILM 56R2 | 1% | 0,4W | | 4822 116 51264 |
| R735 | RESISTOR,M.FILM 5K11 | 1% | 0,4W | | 5322 116 54595 |
| R736 | POTM,TRIMMING 47K | CERMET LIN | 0,5W | | 5322 101 14048 |
| R737 | RESISTOR,M.FILM 4K64 | 1% | 0,4W | | 5322 116 50484 |
| R738 | RESISTOR,M.FILM 205E | 1% | 0,4W | | 5322 116 50669 |
| R741 | RESISTOR,M.FILM 619E | 1% | 0,4W | | 5322 116 54529 |
| R742 | POTM,TRIMMING 10K | CERM LIN | 0,5W | | 5322 100 10113 |
| R820 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R825 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R1101 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R1102 | RESISTOR,M.FILM 750K | 1% | 0,5W | | 5322 116 54335 |
| R1103 | RESISTOR,M.FILM 1K | 0,5% | 0,4W | | 4822 116 51235 |
| R1104 | RESISTOR,M.FILM 1K | 0,5% | 0,4W | | 4822 116 51235 |
| R1106 | RESISTOR,M.FILM 55E6 | 0,25% | 0,1W | | 5322 116 54386 |
| R1108 | RESISTOR,M.FILM 2K49 | 1% | 0,4W | | 5322 116 50581 |
| R1109 | RESISTOR,M.FILM 33E2 | 1% | 0,4W | | 5322 116 50527 |
| R1110 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R1111 | RESISTOR,M.FILM 6K81 | 0,5% | 0,4W | | 4822 116 51252 |
| R1112 | RESISTOR,M.FILM 24K9 | 1% | 0,4W | | 5322 116 54648 |
| R1113 | RESISTOR,M.FILM 1K05 | 1% | 0,4W | | 5322 116 54552 |
| R1114 | RESISTOR,M.FILM 187K | 1% | 0,4W | | 5322 116 54723 |
| R1116 | RESISTOR,M.FILM 8K25 | 1% | 0,4W | | 5322 116 54558 |
| R1117 | RESISTOR,M.FILM 56K2 | | | | 4822 116 51264 |
| R1118 | POTM,TRIMMING 10K | CERM LIN | 0,5W | | 5322 100 10113 |
| R1119 | RESISTOR,M.FILM 5K11 | 1% | 0,4W | | 5322 116 54595 |
| R1121 | POTM,TRIMMING 47K | CERMET LIN | | | 5322 101 14048 |
| R1220 | RESISTOR,M.FILM 100E | 1% | 1/8W | | 5322 116 54469 |
| R2701 | RESISTOR,M.FILM 402E | 1% | 0,4W | | 5322 116 54519 |
| R2702 | RESISTOR,M.FILM 6K19 | 0,5% | 0,4W | | 5322 116 55426 |
| R2703 | RESISTOR,M.FILM 1K96 | | | | 5322 116 54571 |
| R2704 | RESISTOR,M.FILM 1K4 | 1% | 0,4W | | 5322 116 54562 |
| R2706 | RESISTOR,M.FILM 10K | 0,5% | 0,4W | | 4822 116 51253 |
| R2707 | RESISTOR,M.FILM 13K3 | 0,5% | 0,4W | | 5322 116 55276 |
| R2708 | RESISTOR,M.FILM 8K25 | 1% | 0,4W | | 5322 116 54558 |
| R2709 | RESISTOR,M.FILM 681E | 0,5% | 0,4W | | 4822 116 51233 |
| R2711 | RESISTOR,M.FILM 10K | 0,5% | 0,4W | | 4822 116 51253 |

| Item | Ordering number | Description | | | |
|---|---|---|---|---|---|
| R2712 | RESISTOR,M.FILM | 511E | | | 4822 116 51282 |
| R2713 | RESISTOR,M.FILM | 1K62 | 0,5% | 0,4W | 5322 116 55359 |
| R2714 | RESISTOR,M.FILM | 750E | 0,5% | 0,4W | 4822 116 51234 |
| R2716 | RESISTOR,M.FILM | 7K15 | 1% | 0,4W | 5322 116 54606 |
| R2717 | RESISTOR,M.FILM | 4K22 | 1% | 0,4W | 5322 116 50729 |
| R2718 | RESISTOR,M.FILM | 1K | 0,5% | 0,4W | 4822 116 51235 |
| R2719 | RESISTOR,M.FILM | 5K62 | 0,5% | 0,4W | 4822 116 51281 |
| R2721 | RESISTOR,M.FILM | 51E1 | 1% | 0,4W | 5322 116 54442 |
| R2722 | RESISTOR,M.FILM | 51E1 | 1% | 0,4W | 5322 116 54442 |
| R2723 | RESISTOR,M.FILM | 3K83 | 1% | 0,4W | 5322 116 54589 |
| R2724 | RESISTOR,M.FILM | 3K83 | 1% | 0,4W | 5322 116 54589 |
| R2726 | RESISTOR,M.FILM | 3K83 | 1% | 0,4W | 5322 116 54589 |
| R2727 | RESISTOR,M.FILM | 3K83 | 1% | 0,4W | 5322 116 54589 |
| R2728 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2729 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2731 | RESISTOR,M.FILM | 1K4 | 1% | 0,4W | 5322 116 54562 |
| R2732 | RESISTOR,M.FILM | 18K7 | 0,5% | 0,4W | 5322 116 55362 |
| R2733 | RESISTOR,M.FILM | 18K7 | 0,5% | 0,4W | 5322 116 55362 |
| R2734 | RESISTOR,M.FILM | 1K4 | 1% | 0,4W | 5322 116 54562 |
| R2736 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2737 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2738 | RESISTOR,M.FILM | 1K96 | 1% | 0,4W | 5322 116 54571 |
| R2739 | RESISTOR,M.FILM | 5E11 | 1% | 0,4W | 5322 116 54192 |
| R2741 | RESISTOR,M.FILM | 750E | 0,5% | 0,4W | 4822 116 51234 |
| R2742 | POTM,TRIMMING | 50K | CERM LIN | 0,5W | 5322 101 14056 |
| R2743 | RESISTOR,M.FILM | 16K2 | 0,5% | 0,4W | 5322 116 55361 |
| R2744 | RESISTOR,M.FILM | 5E11 | 1% | 0,4W | 5322 116 54192 |
| R2746 | RESISTOR,M.FILM | 7K15 | 1% | 0,4W | 5322 116 54606 |
| R2747 | RESISTOR,M.FILM | 3K48 | 0,5% | 0,4W | 5322 116 55367 |
| R2748 | RESISTOR,M.FILM | 5K11 | 1% | 0,4W | 5322 116 54595 |
| R2749 | RESISTOR,M.FILM | 10K | 0,5% | 0,4W | 4822 116 51253 |
| R2751 | RESISTOR,M.FILM | 20K5 | 1% | 0,4W | 5322 116 54643 |
| R2752 | RESISTOR,M.FILM | 10K | 0,5% | 0,4W | 4822 116 51253 |
| R2753 | RESISTOR,M.FILM | 8K25 | 1% | 0,4W | 5322 116 54558 |
| R2754 | RESISTOR,M.FILM | 10K | 0,5% | 0,4W | 4822 116 51253 |
| R2756 | RESISTOR,M.FILM | 10K | 0,5% | 0,4W | 4822 116 51253 |
| R2757 | RESISTOR,M.FILM | 20K5 | 1% | 0,4W | 5322 116 54643 |
| R2758 | RESISTOR,M.FILM | 31K6 | 1% | 0,4W | 5322 116 54657 |
| R2759 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2761 | RESISTOR,M.FILM | 8K25 | 1% | 0,4W | 5322 116 54558 |
| R2762 | RESISTOR,M.FILM | 8K25 | 1% | 0,4W | 5322 116 54558 |
| R2763 | RESISTOR,M.FILM | 909E | 0,5% | 0,4W | 5322 116 55278 |
| R2764 | RESISTOR,M.FILM | 383E | 1% | 0,4W | 5322 116 54518 |
| R2766 | RESISTOR,M.FILM | 22K6 | 0,25% | 0,4W | 5322 116 50481 |
| R2767 | RESISTOR,M.FILM | 4K02 | 0,5% | 0,4W | 5322 116 55448 |
| R2768 | RESISTOR,M.FILM | 18K7 | 0,5% | 0,4W | 5322 116 55362 |
| R2769 | RESISTOR,M.FILM | 38E3 | 1% | 0,4W | 5322 116 50954 |
| R2771 | RESISTOR,M.FILM | 1K | 0,5% | 0,4W | 4822 116 51235 |
| R2772 | RESISTOR,M.FILM | 3K83 | 1% | 0,4W | 5322 116 54589 |
| R2773 | RESISTOR,M.FILM | 590E | | | 5322 116 50561 |
| R2774 | RESISTOR,M.FILM | 9K53 | 1% | 0,4W | 5322 116 54617 |
| R2776 | RESISTOR,M.FILM | 8K25 | 1% | 0,4W | 5322 116 54558 |
| R2777 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2778 | RESISTOR,M.FILM | 18K7 | 0,5% | 0,4W | 5322 116 55362 |
| R2779 | RESISTOR,M.FILM | 1K | 0,5% | 0,4W | 4822 116 51235 |
| R2781 | RESISTOR,M.FILM | 187E | 1% | 0,4W | 5322 116 54494 |
| R2782 | RESISTOR,M.FILM | 10K | 0,5% | 0,4W | 4822 116 51253 |
| R2783 | RESISTOR,M.FILM | 100K | 0,5% | 0,4W | 4822 116 51267 |
| R2784 | RESISTOR,M.FILM | 1K87 | 1% | 0,4W | 5322 116 50728 |
| R2786 | RESISTOR,M.FILM | 19K6 | 1% | 0,4W | 5322 116 54641 |
| R2787 | RESISTOR,M.FILM | 1K87 | 1% | 0,4W | 5322 116 50728 |
| R2788 | RESISTOR,M.FILM | 20K5 | 1% | 0,4W | 5322 116 54643 |
| R2789 | RESISTOR,M.FILM | 51K1 | 1% | 0,4W | 5322 116 50672 |
| R2791 | RESISTOR,M.FILM | 51K1 | 1% | 0,4W | 5322 116 50672 |
| R2792 | RESISTOR,M.FILM | 51K1 | 1% | 0,4W | 5322 116 50672 |

| Item | Ordering number | Description | | | |
|---|---|---|---|---|---|
| R2793 | RESISTOR,M.FILM | 13K3 | 0,5% | 0,4W | 5322 116 55276 |
| R2794 | RESISTOR,M.FILM | 4K42 | 1% | 0,4W | 5322 116 50556 |
| R2796 | RESISTOR,M.FILM | 10K5 | 1% | 0,4W | 5322 116 50731 |
| R2797 | RESISTOR,M.FILM | 1K21 | 1% | 0,4W | 5322 116 54557 |
| R2798 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2799 | RESISTOR,M.FILM | 8K25 | 1% | 0,4W | 5322 116 54558 |
| R2801 | RESISTOR,M.FILM | 18K7 | 0,5% | 0,4W | 5322 116 55362 |
| R2802 | RESISTOR,M.FILM | 1K | 0,5% | 0,4W | 4822 116 51235 |
| R2803 | RESISTOR,M.FILM | 38E3 | 1% | 0,4W | 5322 116 50954 |
| R2804 | RESISTOR,M.FILM | 3K83 | 1% | 0,4W | 5322 116 54589 |
| R2806 | RESISTOR,M.FILM | 1K21 | 1% | 0,4W | 5322 116 54557 |
| R2807 | RESISTOR,M.FILM | 9K53 | 1% | 0,4W | 5322 116 54617 |
| R2808 | RESISTOR,M.FILM | 8K25 | 1% | 0,4W | 5322 116 54558 |
| R2809 | RESISTOR,M.FILM | 511E | 0,5% | 0,4W | 4822 116 51282 |
| R2811 | RESISTOR,M.FILM | 18K7 | 0,5% | 0,4W | 5322 116 55362 |
| R2812 | RESISTOR,M.FILM | 1K | 0,5% | 0,4W | 4822 116 51235 |
| R2851 | RESISTOR,M.FILM | 1K87 | 1% | 0,4W | 5322 116 50728 |
| R2852 | RESISTOR,M.FILM | 1K87 | 1% | 0,4W | 5322 116 50728 |
| R2853 | | MR25 1% 100K | | | 5322 116 54696 |
| R2854 | | MR25 1% 100K | | | 5322 116 54696 |
| R2856 | | MR25 1% 100K | | | 5322 116 54696 |
| R2857 | | MR25 1% 100K | | | 5322 116 54696 |
| R2858 | | MR25 1% 100K | | | 5322 116 54696 |
| R2859 | RESISTOR,M.FILM | 1K87 | 1% | 0,4W | 5322 116 50728 |
| R2861 | RESISTOR,M.FILM | 1K87 | 1% | 0,4W | 5322 116 50728 |

Transistors/Diodes

| | | | |
|---|---|---|---|
| V701 | TRANSISTOR,FET | BC264A | 5322 130 44476 |
| V702 | TRANSISTOR | BC559B | 4822 130 44358 |
| V703 | TRANSISTOR | BC559B | 4822 130 44358 |
| V704 | TRANSISTOR | BC559B | 4822 130 44358 |
| V705 | DIODE,REFERENCE | BZX75-C2V1 | 4822 130 34049 |
| V706 | TRANSISTOR | BC549C | 4822 130 44246 |
| V707 | DIODE | BAW62 | 4822 130 30613 |
| V708 | DIODE | BAW62 | 4822 130 30613 |
| V709 | DIODE | BAW62 | 4822 130 30613 |
| V711 | TRANSISTOR | BFY90 | 4822 130 40493 |
| V712 | TRANSISTOR | BFY90 | 4822 130 40493 |
| V1101 | TRANSISTOR,FET | BC264A | 5322 130 44476 |
| V1102 | TRANSISTOR | BC559B | 4822 130 44358 |
| V1103 | DIODE | BAW62 | 4822 130 30613 |
| V1104 | TRANSISTOR | BFY90 | 4822 130 40493 |
| V2701 | DIODE | BAV70 | 5322 130 34331 |
| V2703 | TRANSISTOR | BCW30 | 5322 130 44335 |
| V2706 | TRANSISTOR | BCW30R | 5322 130 44341 |
| V2707 | TRANSISTOR | BCW30 | 5322 130 44335 |
| V2708 | TRANSISTOR,FET | BFR30 | 5322 130 44343 |
| V2709 | TRANSISTOR | BCW30 | 5322 130 44335 |
| V2711 | TRANSISTOR | BCW30 | 5322 130 44335 |
| V2712 | TRANSISTOR | BCW30R | 5322 130 44341 |
| V2713 | DIODE | BAV70 | 5322 130 34331 |
| V2714 | DIODE | BAV70 | 5322 130 34331 |
| V2718 | TRANSISTOR | BCW33 | 5322 130 44337 |
| V2721 | DIODE,REFERENCE | BZX79-B12 | 4822 130 34197 |
| V2722 | DIODE,REFERENCE | BZX79-B12 | 4822 130 34197 |
| V2723 | TRANSISTOR | BCW30 | 5322 130 44335 |
| V2723 | DIODE | BAV70 | 5322 130 34331 |
| V2724 | TRANSISTOR | BCW33 | 5322 130 44337 |
| V2726 | DIODE | BAV70 | 5322 130 34331 |
| V2728 | TRANSISTOR | BCW33R | 5322 130 44342 |
| V2729 | DIODE | BAV70 | 5322 130 34331 |
| V2732 | TRANSISTOR | BCW33R | 5322 130 44342 |
| V2736 | TRANSISTOR | BCW33R | 5322 130 44342 |

| *Item* | *Ordering number* | *Description* | |
|---|---|---|---|
| V2737 | DIODE | BAV70 | 5322 130 34331 |
| V2851 | TRANSISTOR | BC559B | 4822 130 44358 |
| V2852 | TRANSISTOR | BC559B | 4822 130 44358 |
| V2853 | DIODE | BAW62 | 4822 130 30613 |
| V2854 | DIODE | BAW62 | 4822 130 30613 |
| V2856 | TRANSISTOR | BC559B | 4822 130 44358 |
| V2857 | TRANSISTOR | BC559B | 4822 130 44358 |
| V2858 | DIODE | BAW62 | 4822 130 30613 |

**Switches**

| | | |
|---|---|---|
| S19 | 5322 270 14023 | |
| S21 | 5322 276 84063 | |

**Units**

| | | |
|---|---|---|
| A109 | 5322 219 84142 | HOLD OFF |
| A9 | 5322 216 54311 | TRIGGER UNIT |
| A16+1602 | 5322 216 54308 | TRIGGER SOURCE UNIT |
| A29 | 5322 216 54307 | TV DEMODULATOR UNIT |
| A1602 | 5322 216 54309 | CONTROL CIRCUIT |

**Mechanical Parts**

| | | |
|---|---|---|
| | 5322 455 44163 | TEXT PLATE |

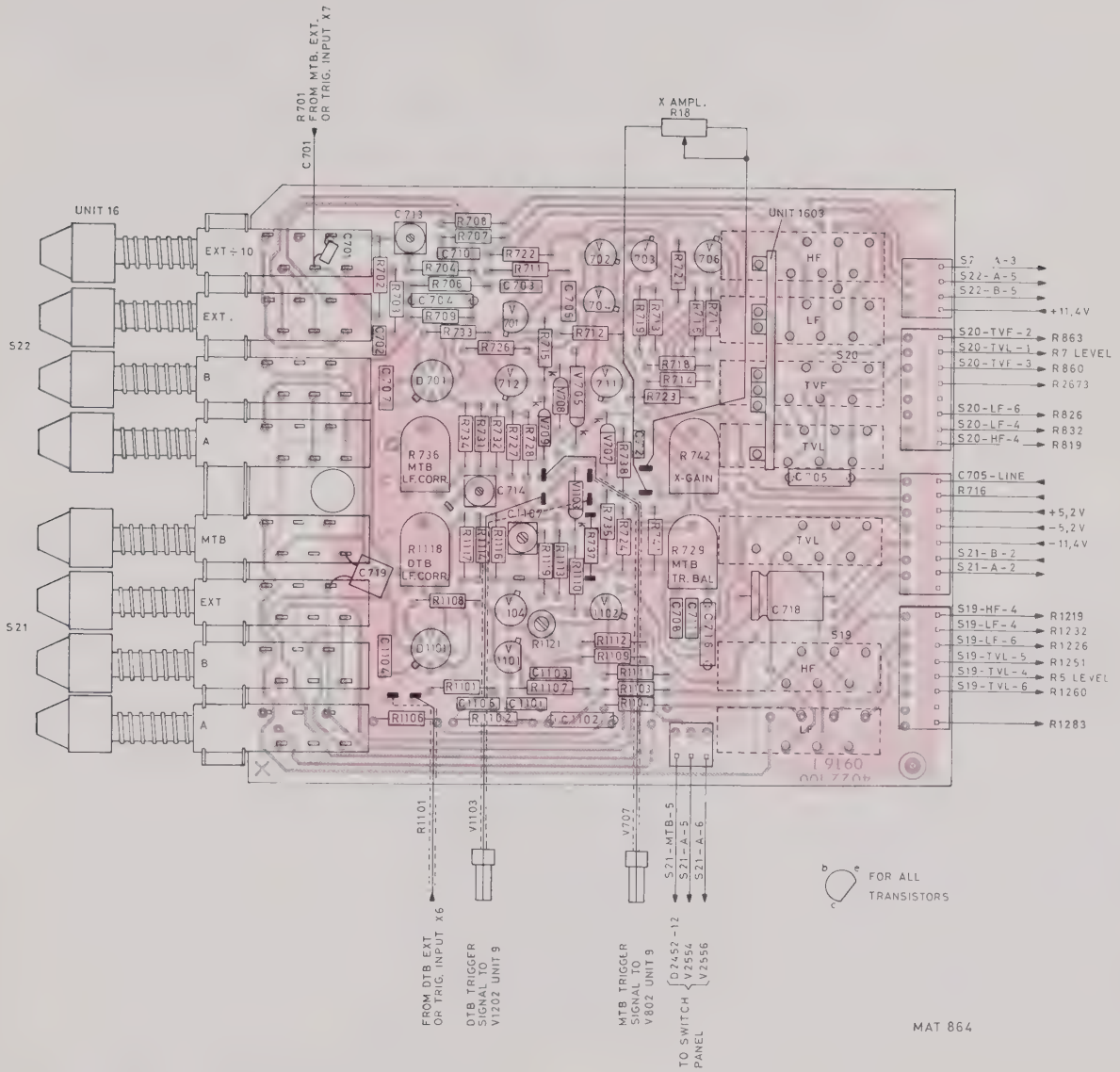


*Fig. 3.13. Trigger source, printed circuit board lay-out*

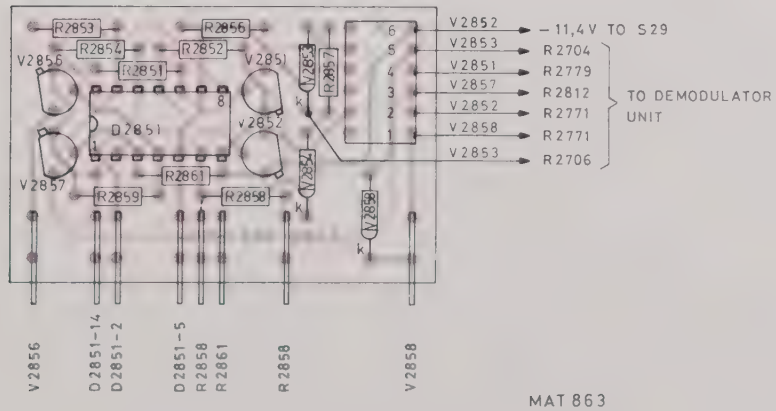


*Fig. 3.14. TV-control, printed circuit board lay-out*

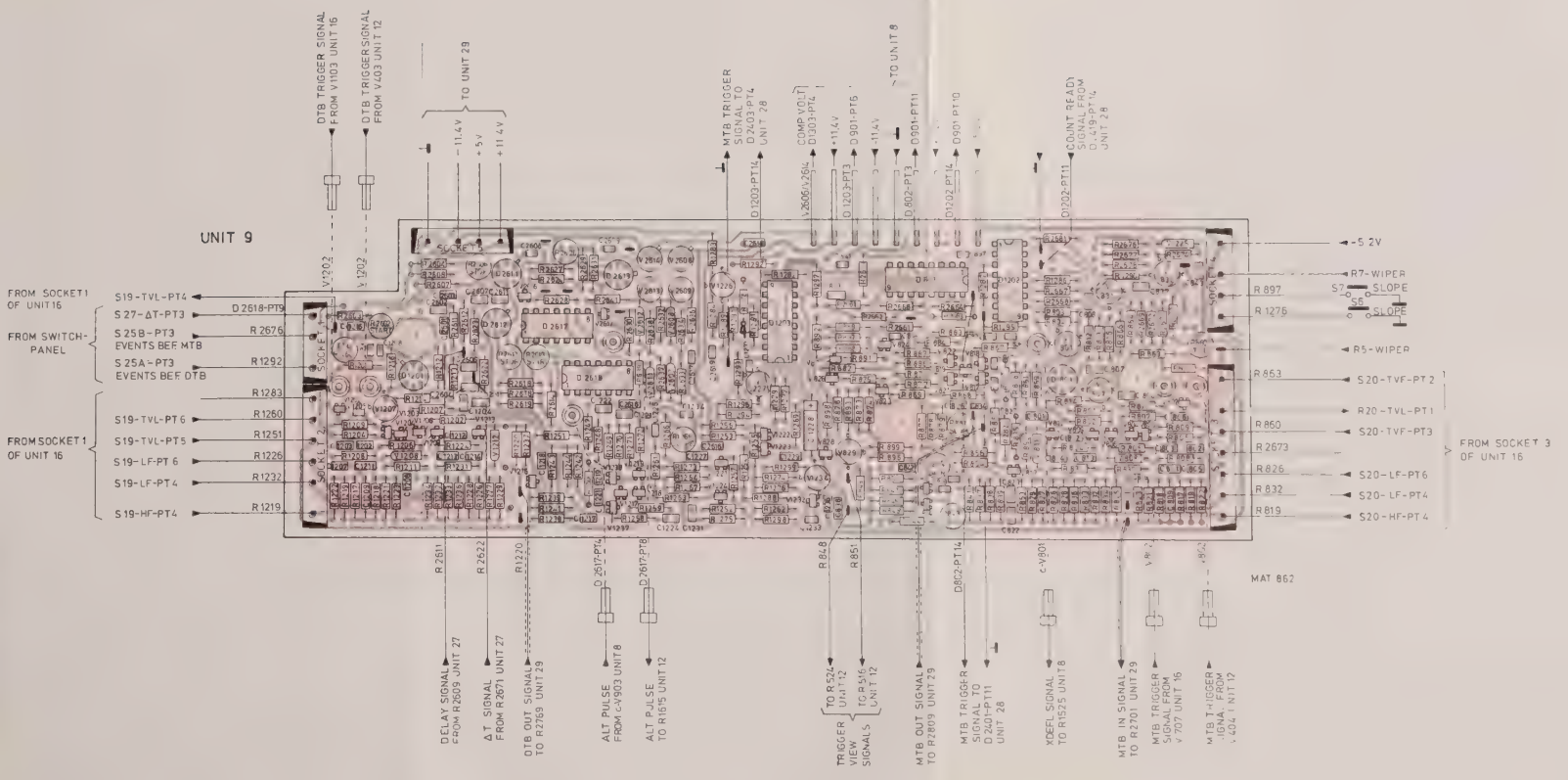


*Fig. 3.15. Trigger unit, printed circuit board lay-out*

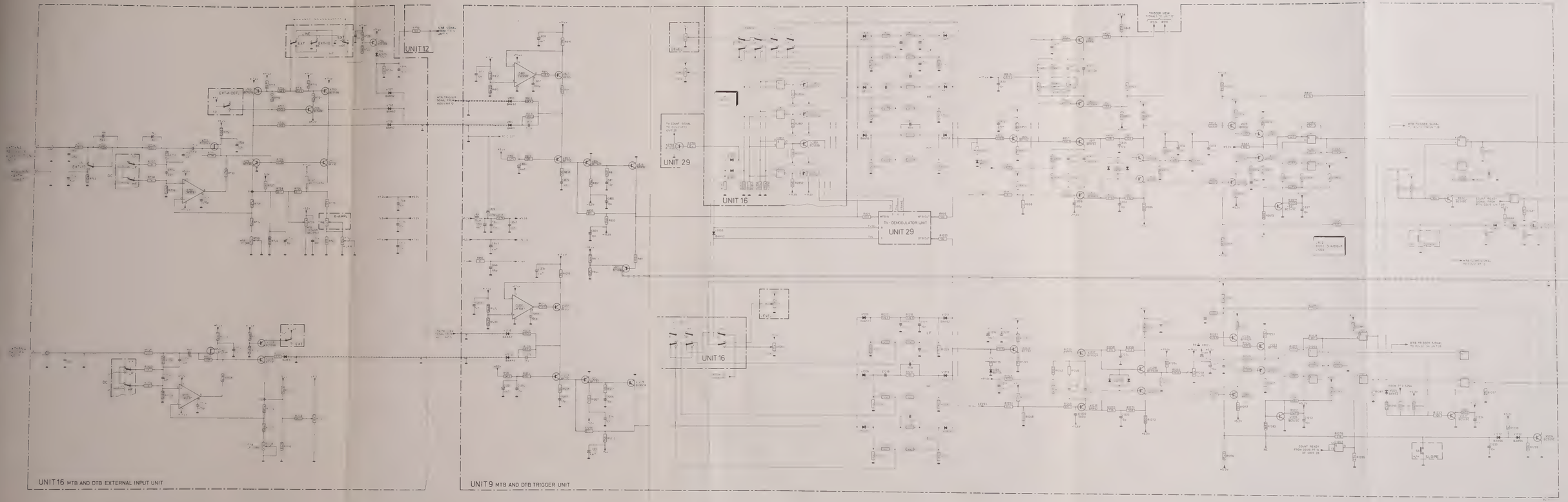


*Fig. 3.16. Trigger source and trigger unit, circuit diagram*

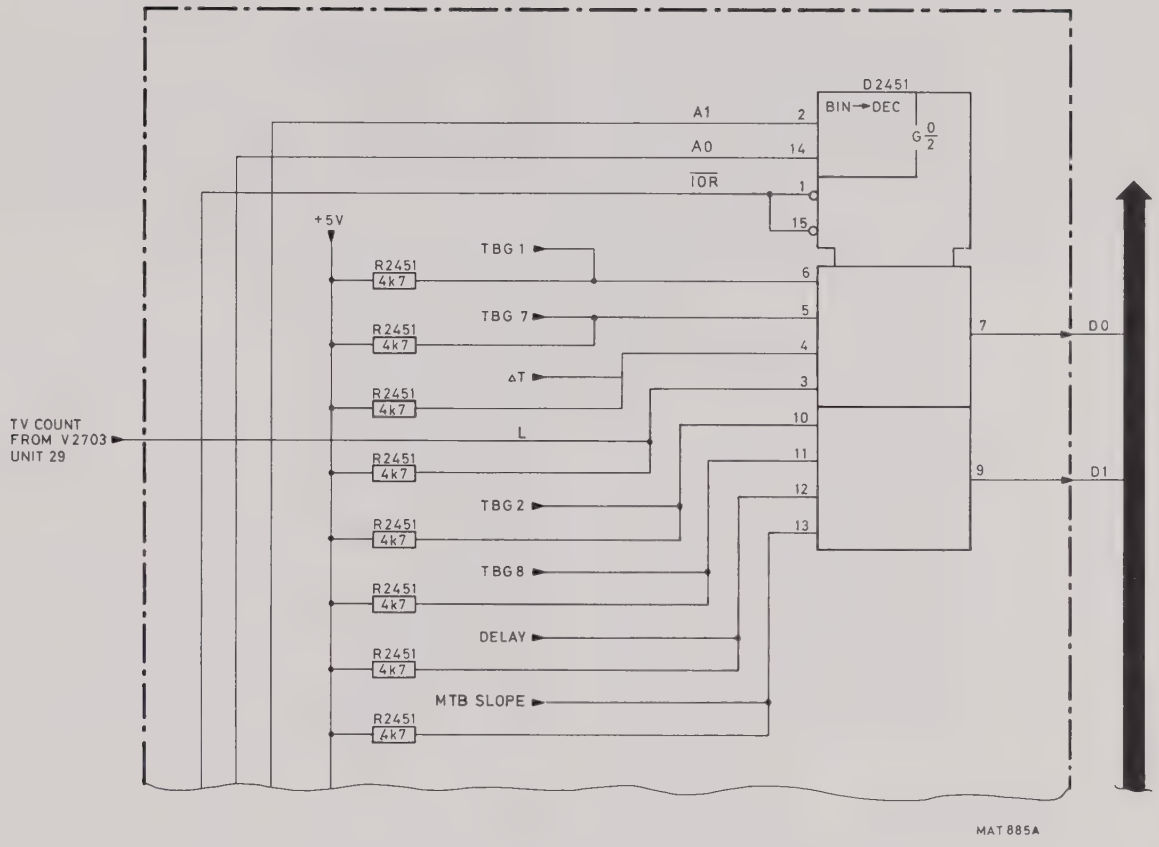


*Fig. 3.19. Detail of the circuit diagram of the Event counter showing the TV-connection*

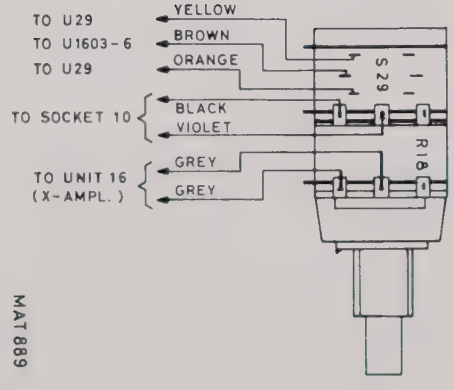


*Fig. 3.20. Hold off/X-Gain/Pull for – video*

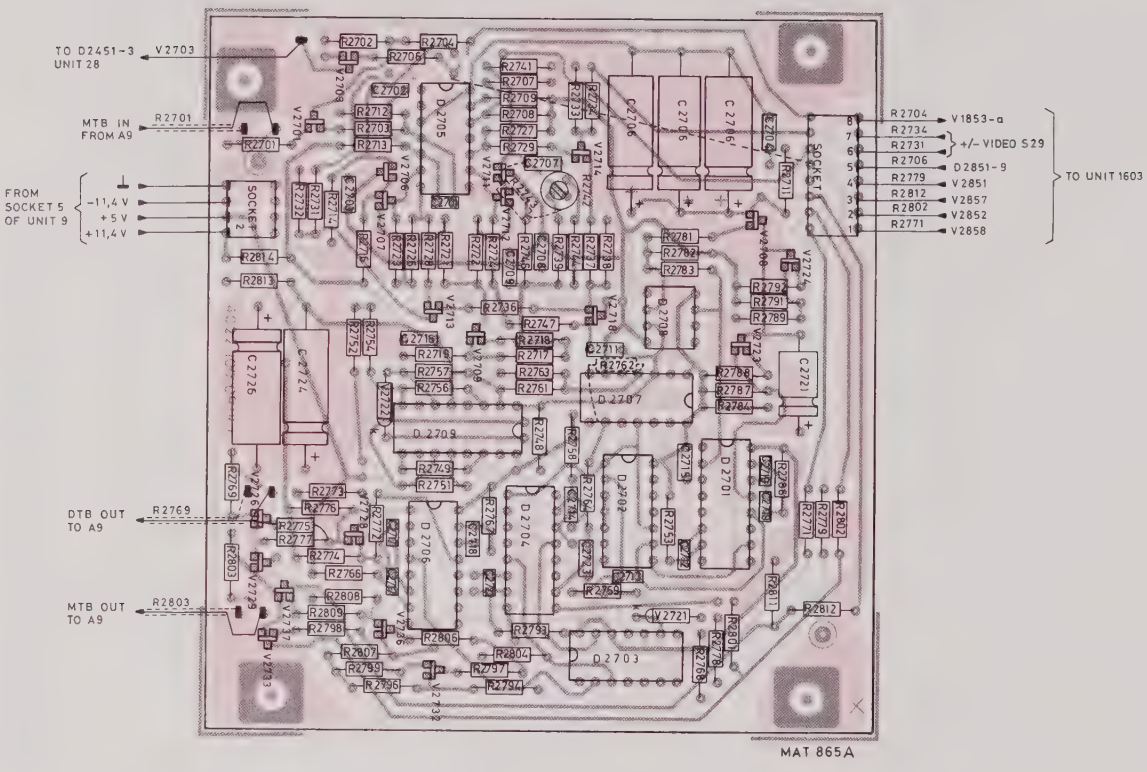


*Fig. 3.17. TV-Demodulator, printed circuit board lay-out*

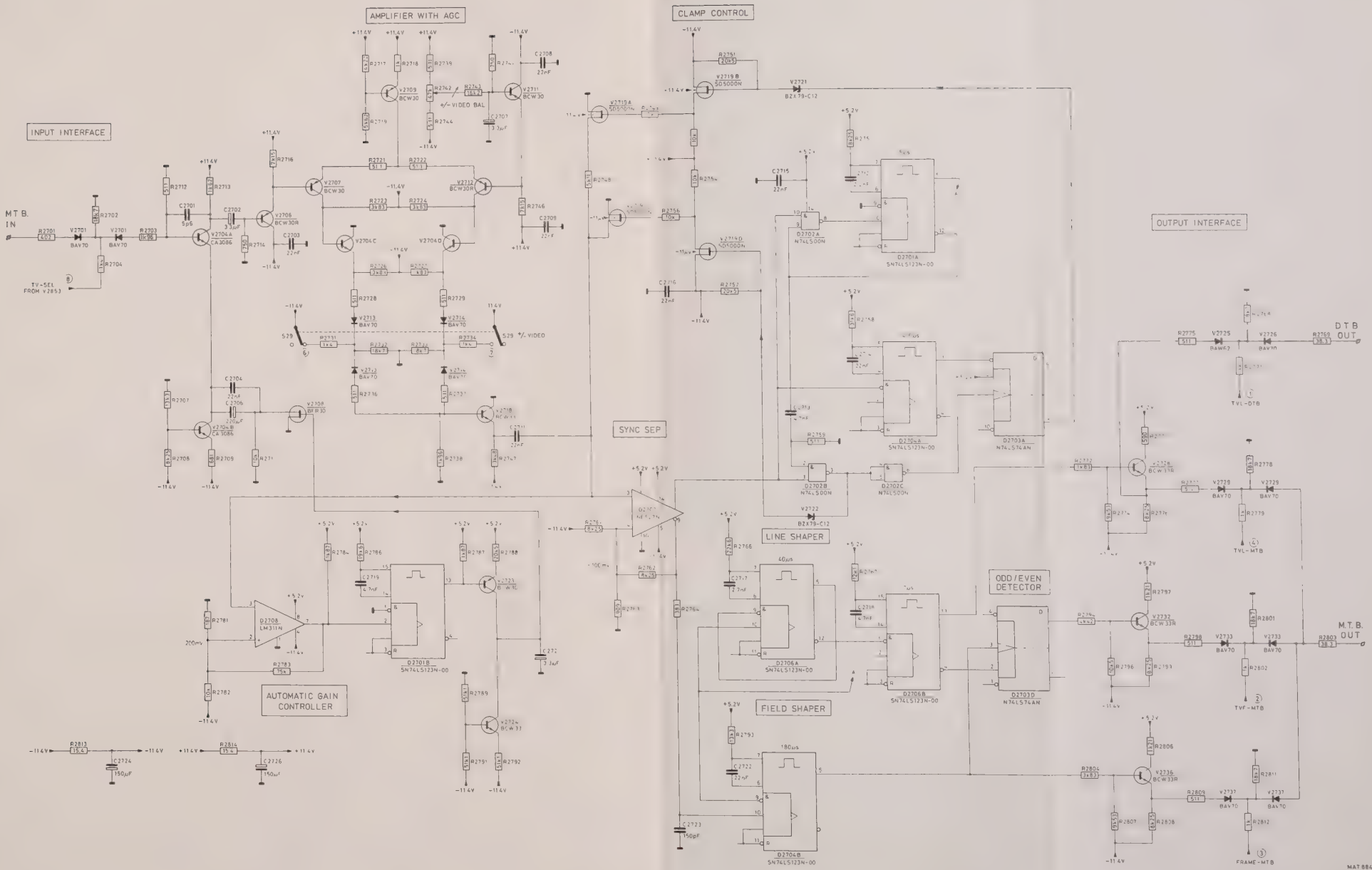


*Fig. 3.18. TV-Demodulator, circuit diagram*

## 3.4. MODIFICATIONS

## CODING SYSTEM OF FAILURE REPORTING FOR QUALITY ASSESSMENT OF T & M INSTRUMENTS

**(excl. potentiometric recorders)**

The information contents of the coded failure description is necessary for our computerized processing of quality data.

Since the reporting of repair and maintenance routines must be complete and exact, we give you an example of a correctly filled-out PHILIPS SERVICE Job sheet.

| ① *Country* | ② *Day Month Year* | ③ *Typenumber* | */Version* | ④ *Factory/Serial no.* |
|---|---|---|---|---|
| 32 | 150475 | OPM3260 | 02 | DO0783 |

*CODED FAILURE DESCRIPTION* ⑥

⑤ *Nature of call*:
- [ ] Installation
- [ ] Pre sale repair
- [ ] Preventive maintenance
- [x] Corrective maintenance
- [ ] Other

*Location*: 0021

*Component/sequence no.*: TS0607 / R00631 / 990001

*Category*: 5 / 2 / 4

⑦ *Job completed*: [x]

*Working time* ⑧: 12 Hrs

Detailed description of the information to be entered in the various boxes:

①Country: 32 = Switzerland

②Day Month Year 150475 = 15 April 1975

③Type number/Version OPM3260 02 = Oscilloscope PM 3260, version 02 (in later oscilloscopes this number is placed in front of the serial no)

④Factory/Serial number DO0783 = DO 783 These data are mentioned on the type plate of the instrument

⑤ Nature of call: Enter a cross in the relevant box

⑥ Coded failure description

*Location*

These four boxes are used to isolate the problem area. Write the code of the part in which the fault occurs, e.g. unit no or mechanical item no of this part (refer to 'PARTS LISTS' in the manual).

Example: 0001 for Unit 1
000A for Unit A
0075 for item 75

If units are not numbered, do not fill in the four boxes; see Example Job sheet.

*Component/sequence no.*

These six boxes are intended to pinpoint the faulty component.

A. Enter the component designation as used in the circuit diagram. If the designation is alfa-numeric,the letters must be written (starting from the left) in the two left-hand boxes and the figures must be written (in such a way that the last digit occupies the right-most box) in the four right-hand boxes.

B. Parts not identified in the circuit diagram:

990000 Unknown/Not applicable
990001 Cabinet or rack (text plate, emblem, grip, rail, graticule, etc.)
990002 Knob (incl. dial knob, cap, etc.)
990003 Probe (only if attached to instrument)
990004 Leads and associated plugs
990005 Holder (valve,transistor, fuse, board, etc.)
990006 Complete unit (p.w. board, h.t. unit, etc.)
990007 Accessory (only those without type number)
990008 Documentation (manual, supplement, etc.)
990009 Foreign object
990099 Miscellaneous

*Category*

0 Unknown, not applicable (fault not present, intermittent or disappeared)
1 Software error
2 Readjustment
3 Electrical repair (wiring, solder joint, etc.)
4 Mechanical repair (polishing, filing, remachining, etc.)
5 Replacement (of transistor, resistor, etc.)
6 Cleaning and/or lubrication
7 Operator error
8 Missing items (on pre-sale test)
9 Environmental requirements are not met

⑦ Job completed: Enter a cross when the job has been completed.

⑧ Working time: Enter the total number of working hours spent in connection with the job (excluding travelling, waiting time, etc.), using the last box for tenths of hours.

12 = 1,2 working hours (1 h 12 min.)

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